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entative Keys to the Orders and Families of Indian Insects

BY

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PREFACE

In issuing the following Keys for the use and criticism of entomological workers in India, emphasis may be laid on the fact of their tentative nature. They are, in fact, only first, rough drafts of Keys, the necessity for which has been felt for many years past by everyone who has to attempt to classify Indian insects. Hitherto, there has been no general guide to such classification. Lefroy's *Indian Insect Life*, published in 1909, gave a brief popular survey of the subject but did not include Keys even to the nine Orders recognised therein. Since then our ideas regarding classification have tended towards the recognition of more minute division into Orders and Families until it has become extremely difficult for any single worker—and most entomological workers in India at present are solitary and scattered—to place a general collection of Indian Insects under their appropriate Families, or even Orders, with any regard to modern ideas of classification, except in the few cases in which we are fortunate enough to have fairly modern *Fauna* volumes in particular groups.

The present Keys are largely modelled on Brues' and Melander's very useful little volume of *Keys to the Families of North American Insects*, but those Keys, even when they have been used to form the foundations of the present ones, have necessarily had to be modified considerably to meet the case of Indian Insects. All workers on such lines use the work of their predecessors and borrow from their contemporaries, with such modifications as are indicated by personal knowledge or opinion, and the present publication forms no exception to this rule. Where *Fauna* volumes have been available, they have been used as far as possible, except in the case of Lepidoptera, where the *Fauna* classification is considerably out of date: in other cases the best available modern classification (modified as necessary) has been used as far as possible. I am indebted to Mr. C. R. Dutt for the preparation of the Key to Families of Hymenoptera; for the rest I am responsible.

My original idea was to issue these Keys only after the inclusion of illustrations of all the structural characters referred to, but under present circumstances this would have involved a delay of probably at least three years in their issue. It seems therefore better to issue them now, in order that they may be made use of by entomological workers in

India, from whom I shall be glad to receive any criticism, which can be considered and incorporated, if desirable, in a later edition, which will, I hope, be accompanied by the necessary illustrations showing the characters of all the Families.

PUSA,
3rd April 1925.

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Imperial Entomologist.

Tentative Keys to the Orders and Families of Indian Insects

(*Received for publication on 6th April 1925.*)

Synopsis of Orders and Families of Indian Insects.

1. MACHILOIDA :	Machilidæ.
2. THYSANURA :	Lepismatidæ.
3. PROTURA :	Protapteridæ.
4. CAMPODEOIDA :	1, Campodeidæ ; 2, Japygidæ.
5. COLLEMBOLA :	1, Smynthuridæ ; 2, Poduridæ ; 3, Entomobryidæ.
6. EPHEMEROIDA :	(Ephemeroidea) 1, Palingeniadæ ; 2, Polymitarcidæ ; 3, Ephemeridæ ; 4, Potamanthidæ ; (Baëtoidea) 5, Leptophlebiadæ ; 6, Ephemerellidæ ; 7, Brachycercidæ (Caenidæ) ; 8, Baëtidæ; (Heptagenioidea) 9, Siphlonuridæ ; 10, Ecdyonuridæ.
7. ODONATA :	(Anisoptera) 1, Æshnidæ ; 2, Libellulidæ ; (Anisozygoptera) 3, Epiophlebiadæ ; (Zygoptera) 4, Agrionidæ ; 5, Lestidæ ; 6, Coenagrionidæ.
8. EMBIADINA :	1, Embiadæ ; 2, Oligotomidæ.
9. PLECOPTERA :	1, Nemouridæ ; 2, Perlidæ.
10. ISOPTERA :	1, Kalotermitidæ ; 2, Termitidæ.
11. BLATTOIDA :	1, Ectobiadæ ; 2, Pseudomopidæ (Phyllodromiadæ) ; 3, Phoraspididæ (Epilampridæ) ; 4, Blattidæ (Periplanetidæ) ; 5, Panchloridæ ; 6, Corydiadæ ; 7, Oxyhaloadæ ; 8, Perispheridæ ; 9, Panesthiadæ.
12. MANTOIDA :	1, Porlamantidæ (Amorphoscelidæ) ; 2, Eremiaphilidæ ; 3, Choeradodidæ ; 4, Mantidæ ; 5, Hymenopodidæ (Creobotridæ) ; 6, Oxypilidæ ; 7, Vatidæ ; 8, Empusidæ.
13. DERMAPTERA :	1, Apachyidæ ; 2, Pygidicranidæ ; 3, Labiduridæ ; 4, Labiadæ ; 5, Forficulidæ.
14. PHASMOIDA :	1, Obrimidæ ; 2, Aschiphasmidæ ; 3, Heteropterygidæ ; 4, Phyllidæ ; 5, Clitumnidæ ;

6, Lonchodidæ; 7, Phibalosomatidæ; 8. Acrophyllidæ; 9, Necrosciadæ.

15. ORTHOPTERA: 1, Gryllacridæ: 2. Tettigoniadæ; 3, Gryllidæ; 4, Gryllotalpidæ; 5, Tridactylidæ; 6, Acrydiidæ; 7, Acrididæ.

16. THYSANOPTERA: 1. Æolothripidæ; 2, Thripidæ; 3, Panchaetothripidæ; 4, Ecacanthothripidæ; 5, Phlœothripidæ; 6, Idolothripidæ; 7, Megathripidæ; 8, Hystricothripidæ.

17. ZORAPTERA: Zorotypidæ.

18. PSOCINA: 1. Psocidæ; 2, Caeciliidæ: 3. Myopsocidæ; 4, Mesopsocidæ; 5, Amphientomidæ; 6 Lachesillidæ; 7, Lepidillidæ: 8. Atropidæ; 9, Troctidæ.

19. ANOPLURA: (Mallophaga) 1. Philopteridæ; 2, Trichodectidæ; 3, Menoponidæ; 4, Læmobothriidæ; 5, Ricinidæ; 6, Gyropidæ: (Pediculina) 7, Haematopinidæ; 8, Pediculidæ: 9, Haematomyzidæ.

20. HOMOPTERA: 1. Flatidæ: 2, Ricaniadæ; 3, Lophopidæ; 4, Issidæ; 5, Amphiscepidæ (Acanaloniadæ); 6, Achilidæ: 7, Eurybrachidæ; 8, Fulgoridæ; 9, Dictyopharidæ; 10, Achilixiidæ: 11, Derbidæ; 12, Tropiduchidæ; 13, Delphacidæ; 14, Cixiidæ; 15, Tettigometridæ: 16. Jassidæ; 17, Membracidæ; 18, Cercopidæ; 19. Cicadidæ; 20, Psyllidæ: 21, Aphididæ; 22. Aleyrodidæ; 23, Coccidæ; 24, Lacciferidæ (Tachardiadæ).

21. HEMIPTERA: 1, Notonectidæ; 2, Corixidæ; 3. Belostomatidæ; 4, Nancoridæ: 5, Ochtheridæ (Pelogonidæ); 6, Acanthiadæ (Saldidæ); 7, Dipsocoridæ (Ceratocombidæ); 8, Miridæ (Capsidæ); 9, Anthocoridæ; 10, Cimicidæ; 11, Polyctenidæ; 12, Nepidæ; 13, Henicocephalidæ; 14, Phymatidæ; 15, Reduviidæ; 16, Nabididæ; 17, Hebridæ; 18. Mesoveliadæ; 19. Hydrometridæ; 20, Veliadæ; 21. Gerridæ; 22. Tingitidæ; 23, Lygæidæ; 24, Pyrrhocoridæ; 25, Coreidæ; 26, Berytidæ; 27, Termitaphididæ; 28, Aradidæ; 29, Cydnidæ; 30, Pentatomidæ; 31, Graphosomatidæ; 32, Scutelleridæ; 33, Plataspididæ.

22. MEGALOPTERA Sialidæ.

23 RAPHIDIOIDA : Raphidiadæ.

24. NEUROPTERA : 1, Ithonidæ; 2, Hemerobiidæ; 3, Dilaridæ; 4, Sisyridæ; 5, Sympherobiidæ; 6, Coniopterygidæ; 7, Psychopsidæ; 8, Osmylidæ; 9, Berothidæ; 10, Apochrysidæ; 11, Chrysopidæ; 12, Mantispidæ; 13, Nemopteridæ; 14, Myrmeleonidæ; 15, Ascalaphidæ.

25. STREPSIPTERA : 1, Xenidæ; 2, Myrmecolacidæ; 3, Halictophagidæ.

26. COLEOPTERA : 1, Cicindelidæ; 2, Carabidæ; 3, Amphizoidæ; 4, Hygrobiidæ (Pelobiidæ); 5, Haliplidæ; 6, Dytiscidæ; 7, Gyrinidæ; 8, Paussidæ; 9, Rhysodidæ; 10, Cupedidæ; 11, Staphylinidæ; 12, Pselaphidæ; 13, Scydmaenidæ; 14, Silphidæ; 15, Clambidæ; 16, Trichopterygidæ; 17, Corylophidæ; 18, Scaphidiidæ; 19, Histeridæ; 20, Niponiidæ; 21, Synteliadæ; 22, Trogositidæ; 23, Nitidulidæ; 24, Cucujidæ; 25, Monotomidæ; 26, Erotylidæ; 27, Cryptophagidæ; 28, Phalacridæ; 29, Lathridiidæ; 30, Mycetophagidæ; 31, Colydiidæ; 32, Endomychidæ; 33, Coccinellidæ; 34, Dermestidæ; 35, Byrrhidæ; 36, Nosodendridæ; 37, Georyssidæ; 38, Dryopidæ (Parnidæ); 39, Hydrophilidæ; 40, Heteroceridæ; 41, Dascillidæ; 42, Helodidæ; 43, Sandalidæ (Rhipiceridæ); 44, Cantharidæ (Telephoridæ); 45, Melyridæ; 46, Cleridæ; 47, Lymexylonidæ; 48, Anobiidæ (Ptinidæ); 49, Bostrychidæ; 50, Lyctidæ; 51, Sphindidæ; 52, Cioidæ; 53, Buprestidæ; 54, Elateridæ; 55, Throscidæ; 56, Tenebrionidæ; 57, Lagriadæ; 58, Othniidæ; 59, Cistelidæ; 60, Monommidæ; 61, Œdemeridæ; 62, Pythidæ; 63, Melandryidæ; 64, Scraptiadæ; 65, Mordellidæ; 66, Rhipiphoridæ; 67, Meloidæ; 68, Pyrochroidæ; 69, Xylophilidæ; 70, Anthicidæ; 71, Tricteno-tomidæ; 72, Lariadæ (Bruchidæ); 73, Chrysomelidæ; 74, Cerambycidæ; 75, Lamiadæ; 76, Brenthidæ; 77, Platyrrhinidæ (Anthribidæ); 78, Curculionidæ; 79, Scolytidæ (Ipidæ); 80, Passalidæ; 81, Lucanidæ; 82, Melolonthidæ;

83, Rutelidæ ; 84, Dynastidæ ; 85, Cetoniadæ ; 86, Scarabæidæ

27 HYMENOPTERA : (Tenthredinoidea) 1, Xyelidæ ; 2, Pamphiliidæ ; 3, Tenthredinidæ ; 4, Xiphydriadæ ; 5, Siricidæ ; 6, Cephidæ ; 7, Oryssidæ ; (Ichneumonoidea) 8, Vipionidæ ; 9, Alysiidæ ; 10, Stephanidæ ; 11, Banchidæ ; 12, Braconidæ ; 13, Evaniadæ ; 14, Trigonalidæ ; 15, Ichneumonidæ : (Cynipoidea) 16, Figitidæ ; 17, Cynipidæ ; 18, Ibaliadæ ; (Chalcidoidea) 19, Mymaridæ ; 20, Trichogrammidæ ; 21, Tetrastichidæ ; 22, Entedontidæ ; 23, Eulophidæ ; 24, Elasmidæ ; 25, Elachertidæ ; 26, Pteromalidæ ; 26*a*, Miscogasteridæ ; 27, Spalangidæ ; 28, Tridymidæ ; 29, Aphelinidæ ; 30, Encyrtidæ ; 31, Signiphoridæ ; 32, Eupelmidæ ; 33, Callimomidæ (Torymidæ) ; 34, Eurytomidæ ; 35, Perilampidæ 36, Eucharidæ ; 37, Chalcididæ ; 38, Leucospidæ ; 39, Agaonidæ ; (Serphoidea) (Proctotrypoidea) 40, Platygastridæ ; 41, Scelionidæ ; 42, Ceraphronidæ ; 43, Diapriadæ ; 44, Belytidæ ; 45, Serphidæ ; 46, Heloridæ ; 47, Pelecenidæ ; (Formicoidea) 48, Formicidæ ; (Chrysidoidea) 49, Chrysididæ ; (Vespoidea) 50, Bethylidæ ; 51, Dryinidæ ; 52, Scoliadæ ; 53, Sapygidæ ; 54, Methocidæ ; 55, Myrmosidæ ; 56, Mutillidæ ; 57, Psammocharidæ (Pompilidæ) ; 58, Eumenidæ ; 59, Vespidæ (Sphecoidea) ; 60, Ampulicidæ ; 61, Sphecidæ ; 62, Bembicidæ ; 63, Cerceridæ ; (Apoidea) 64, Apidæ ; 65, Bombidæ ; 66, Psithyridæ ; 67, Anthophoridæ ; 68, Nomadidæ ; 69, Ceratinidæ ; 70, Xylocopidæ ; 71, Megachilidæ ; 72, Stelidæ ; 73, Andrenidæ ; 74, Colletidæ ; 75, Hylæidæ.

28. LEPIDOPTERA : 1, Eriocraniadæ ; 2, Hepialidæ ; 3, Heterogeneidæ (Limacodidæ) ; 4, Epipyropidæ ; 5, Zygænidæ ; 6, Psychidæ ; 7, Tineidæ ; 8, Adelidæ ; 9, Incurvariadæ ; 10, Nepticulidæ ; 11, Heliozelidæ ; 12, Lyonetiadæ ; 13, Lithocolletidæ (Gracillariadæ) ; 14, Eupistidæ (Coleophoridæ) ; 15, Plutellidæ ; 16, Amphitheridæ ; 17, Epermeniadæ ; 18, Yponomeutidæ ;

19, Scythrididæ ; 20 ,Glyphipterygidæ ; 21, Chlidanotidæ ; 22, Eucosmidæ ; 23, Tortricidæ ; 24, Phaloniadæ ; 25, Carposinidæ ; 26, Cossidæ ; 27, Teragridæ (Arbelidæ) ; 28, Thyrididæ ; 29, Ægeriadæ ; 30, Heliodinidæ ; 31, Elachistidæ ; 32, Copromorphidæ ; 33, Orneodidæ ; 34, Cryptophasidæ (Xyloryctidæ) ; 35, Physoptilidæ ; 36, Œcophoridæ ; 37, Metachandidæ ; 38, Ypsolophidæ (Gelechiadæ) ; 39, Blastobasidæ ; 40, Cosmopterygidæ ; 41, Alucitidæ (Pterophoridæ) ; 42, Pyralidæ ; 43, Callidulidæ (incl. *Pterothysanus*) ; 44, Tascinidæ (Neocastniadæ) ; 45, Hesperiadæ ; 46, Lycænidæ ; 47, Nemeobiidæ (Erycinidæ) ; 48, Papilionidæ ; 49, Parnassiidæ ; 50, Pieridæ ; 51, Acræidæ ; 52, Libythæidæ ; 53, Nymphalidæ ; 54, Morphidæ ; 55, Satyridæ ; 56, Danaidæ ; 57, Drepanidæ ; 58, Uraniadæ ; 59, Epiplemidæ (incl. *Epicopeia*) ; 60, Geometridæ ; 61, Lasiocampidæ , 62, Eupterotidæ ; 63, Brahmacidæ ; 64, Bombycidæ ; 65, Attacidæ (Saturniadæ) ; 66, Sphingidæ ; 67, Ceruridæ (Notodontidæ) ; 68, Thyatiridæ (Cymatophoridæ) ; 69, Asotidæ (Hypsidæ) ; 70, Liparidæ (Lymantriadæ) ; 71, Noctuidæ (incl. *Agaristidæ*) ; 72, Lithosiadæ (Arctiadæ) ; 73, Amatidæ (Syntomidæ).

29. TRICHÓPTERA : 1, Phryganeidæ ; 2, Limnophilidæ ; 3, Sericostomatidæ ; 4, Calamoceratidæ ; 5, Odontoceridæ ; 6, Leptoceridæ ; 7, Molannidæ ; 8, Hydropsychidæ ; 9, Polycentropidæ ; 10, Philopotamidæ ; 11, Rhyacophilidæ ; 12, Hydroptilidæ.

30. MECOPTERA : 1, Panorpidæ ; 2, Bittacidæ.

31. DIPTERA : 1, Mycetophilidæ ; 2, Bibionidæ ; 3, Simulidæ ; 4, Blephariceridæ ; 5, Deuterophlebiadæ ; 6, Psychodidæ ; 7, Culicidae ; 8, Chironomidæ ; 9, Cecidomyiadæ ; 10, Dixidæ ; 11, Tipulidæ ; 12, Rhyphidæ ; 13, Rhagionidæ (Leptididæ) ; 14, Xylophagidæ ; 15, Coenomyiadæ ; 16, Stratiomyidæ ; 17, Tabanidæ , 18, Nemestrinidæ ; 19, Cyrtidæ ; 20, Bombylidæ ; 21, Scenopinidæ ; 22, Therevidæ ; 23, Mydaidæ ; 24, Asilidæ ; 25, Lonchopteridæ ; 26, Empididæ ;

27, Dolichopodidæ; 28, Phoridæ; 29, Platypezidæ; 30, Pipunculidæ; 31, Syrphidæ; 32, Conopidæ; 33, Pyrgotidæ; 34, Micropezidæ (Calobatidæ); 35, Tanypezidæ; 36, Psilidæ; 37, Ortalididæ; 38, Trypaneidæ (Trypetidæ); 39, Lauxaniadæ (Sapromyzidæ); 40, Lonchæidæ; 41, Agromyzidæ; 42, Ochthiphilidæ; 43, Milichiadæ; 44, Geomyzidæ; 45, Chloropidæ; 46, Drosophilidæ; 47, Sepsidæ; 48, Piophilidæ; 49, Ephydridæ; 50, Phycodromidæ; 51, Heteroneuridæ; 52, Tetanoceridæ (Sciomyzidæ); 53, Dryomyzidæ; 54, Helomyzidæ; 55, Celyphidæ; 56, Borboridæ; 57, Diopsidæ; 58, Scatophagidæ; 59, Anthomyiadæ; 60, Muscidæ; 61, Tachinidæ; 62, Dexiidæ; 63, Sarcophagidæ; 64, Calliphoridæ; 65, Gasterophilidæ; 66, Œstridæ; 67, Hippoboscidæ; 68, Streblidæ; 69, Nycteribiadæ.

32. SIPHONAPTERA: 1, Pulicidæ; 2, Ceratophyllidæ; 3, Hystrichopsyllidæ; 4, Leptopsyllidæ; 5, Ischnopsyllidæ; 6, Tungidæ (Dermatophilidæ).

Key to Orders of Indian Insects (Adult Forms only).

1. Mouthparts either retracted in cavity of head or practically wanting or not mandibulate 2
   Mouthparts not retracted in cavity of head but mandibulate 3
2. Ventral region of abdomen bearing either styli, vestigial legs or ventral tube; never winged (Apterygota) 1
   Abdomen without styli, vestigial legs or ventral tube; normally provided with wings in adult stage. (Pterygota) 8
3. Abdomen with more than one pair of styli; never winged (Apterygota) 4
   Abdomen with at most one pair of styli, usually none; adult stage normally winged. (Pterygota) 7

4. Abdomen consisting of six segments or less, with a forked sucker on first ventral segment and usually with a springing apparatus (furcula) near the tip beneath . . . COLLEMBOLA.

Abdomen consisting of ten or more segments, no ventral sucker at its base, no terminal springing apparatus 5

5. Basal four segments of abdomen with ventral styles; no cerci; head pear-shaped; prothorax short . . PROTURA.

Ventral styles occurring to seventh segment; cerci present; prothorax not short 6

6. Body never scaly; mouthparts concealed except for palpi; apex of abdomen without median process . CAMPODEOIDA.

Body usually covered with minute scales; tips of mouthparts visible; abdomen with median cerciform appendage 7

7. Body rather flattened; eyes not extending over front; maxillary palpi 5 or 6 jointed; eleventh tergite partly covered by tenth . . THYSANURA.

Body strongly convex above; eyes large, extending over the front; maxillary palpi 7-jointed; eleventh tergite not covered by tenth . . MACHILOIDA.

8. Wings developed in adult 9

Wings in adult not developed or vestigial 33

9. With forewings only present 10

With two pairs of wings 12

10. Mouth not functional; abdomen with a pair of caudal filaments 11

Mouthparts forming a proboscis, only exceptionally vestigial; abdomen without caudal filaments; hind-wings replaced by knobbed halteres . . . . . DIPTERA.

11. Antennæ relatively large; cross-veins wanting; hindwings represented by minute halteres. (Some males of Coccidæ) . . . . . HOMOPTERA.
Antennæ inconspicuous; cross-veins abundant; no halteres . . . EPHEMEROIDA.

12. Forewing horny or leathery, of distinctly stouter texture than hindwing 13
Forewing membranous, of approximately similar texture to hindwing 20

13. Mouthparts formed for sucking 14
Mouthparts formed for biting 15

14. Gula well-developed, very long in some groups; head projects forward and proboscis is bent at its base and lies under the head when at rest; forewing usually not uniform in thickness throughout . HEMIPTERA (Heteroptera).

Gula absent or represented only by a small membrane; head is deflexed and inflexed so that the base of the labium is in intimate connection with prosternum; labium, when at rest, projects backwards between the legs, more or less in line with the head, and is not bent at a sharp angle to it; forewing usually uniform in thickness throughout . HOMOPTERA.

15. Forewing minute; prothorax small; antenna short, with 4 to 7 joints; no cerci; minute insects . . STREPSIPTERA.
Not as above 16

16. Apex of abdomen provided with moveable forceps . . . . . DERMAPTERA.
Not as above 17

17. Forewing horny, forming a protective covering for hindwing; forewings sometimes joined together; hind-

wings, when functional, folded transversely beneath forewing when in resting position . . . . . COLEOPTERA.

Forewing leathery but never horny; forewings never joined together; hindwings, when functional, folded beneath forewings when in resting position but folds are always longitudinal and never transverse 18

18. Large elongate insects; body usually rounded (rarely flattened and leaf-like); forelegs not formed for burrowing or for catching prey; hindlegs not formed for jumping. (Stick-insects) . . . . . PHASMOIDA.

Hind femora almost always much larger than fore-femora and hindlegs formed for jumping or forelegs formed for burrowing; body more or less rounded . . . . ORTHOPTERA.

Hind femora not larger than fore-femora; hindlegs not formed for jumping or forelegs for burrowing; body more or less flattened 19

19. Body rather elongate; head transverse, vertical, very freely moveable, not set into the very long prothorax; forelegs formed for grasping prey; no separate anal area to forewing . . . . . MANTOIDA.

Body oval, much flattened; head nearly concealed beneath oval pronotum; legs similar, not formed for grasping prey, with large coxæ; forewing with distinct anal area . BLATTOIDA.

20. Mouthparts formed essentially for biting 21

Mouthparts formed essentially for sucking 32

Mouthparts formed for both biting and sucking (bees) . . . HYMENOPTERA.

Mouthparts rudimentary . . . EPHEMEROIDA.

21. Antennæ inconspicuous, shorter than head; ventral surface of second and third abdominal segments of male provided with copulatory apparatus. Larva with extensile mask for grasping prey. (These two characters of Odonata are unique in insecta) . . . ODONATA.

Antennæ large, distinct, longer than head 22

22. Tarsi 5-jointed 27

Tarsi with less than 5 joints 23

23. Prothorax conspicuously enlarged 24

Prothorax not conspicuously enlarged, only moderately long 25

24. Prothorax large, broad, often as broad as head; antennæ and cerci long; contour of outer margin of hindwing strongly broken by re-entrant angle separating anal fan from remainder of wing . . . . . PLECOPTERA.

Prothorax long, narrower than head; antennæ moderate; no cerci; no re-entrant angle on outer margin of hindwing . . . . . RAPHIDIOIDA.*

25. Wings similar, narrow 26

Wings dissimilar, the hindwing much smaller than forewing; tarsi with 2 or 3 joints; vertex of head (*i.e.*, space between eyes) divided into two parts by a longitudinal suture . PSOCINA.

26. Tarsi apparently 4-jointed; cerci with several joints; antennæ with 9 to over 30 joints; front tarsi not swollen; wings with transverse suture near base; no strong cross-veins . . . . . ISOPTERA.

Tarsi 3-jointed; first joint of front tarsus swollen and containing a silk spinning organ; a few strong cross-veins . . . . . EMBIADINA.

(* In Raphidioida the tarsi are really 5-jointed; but the 4th joint being small and hidden, there may appear to be less than five).

Tarsi 2-jointed ; cerci one-jointed ; antennæ with 9 joints ; front tarsi not swollen ; no transverse suture in wings ; very few strong cross-veins. ZORAPTERA.

27. Head produced into mandibulate beak ; hindwing as broad as forewing . MECOPTERA.

No mandibulate beak (exceptionally present in *Croce* and allies, in which case the hindwing is extremely slender and long) 28

28. Prothorax conspicuously enlarged ; foreleg not raptorial 29

Prothorax not conspicuously enlarged or fore-leg raptorial 30

29. Prothorax long, slender, cylindrical ; wings transparent ; small insects, with slender black body . . RAPHIDIOIDA.

Prothorax broad, not cylindrical ; wings usually with colour-pattern ; large insects, body not black . . MEGALOPTERA.

30. Mouthparts weakly developed ; forewing larger than hindwing, covered with hairs which usually form a distinct pattern ; antennæ often extremely long, tapering . . . TRICHOPTERA.

Mouthparts strongly developed ; wings usually without pattern, if present it is not produced by hairs ; antennæ various, but rarely extremely long 31

31. Wings similar (exceptionally dissimilar in *Croce* and allies, which have hindwing extremely long and slender and a mandibulate beak) with many veins and cross-veins ; costal cell almost always filled with cross-veins ; prothorax more or less free. (If neuration is reduced, *e.g.*, in Coniopterygidæ, the wings are powdered) . . . . . NEUROPTERA.

Forewing larger than hindwing ; wings with relatively few angular veins ;

costal cell without cross-veins; if neuration is reduced, the wings are not powdered; prothorax fused with meso-thorax; abdomen usually constricted at base and ending in a sting or specialized ovipositor (in female sex) . . . . . HYMENOPTERA.

32. Wings long, very narrow, margins fringed with long hairs, almost veinless; tarsi one or two-jointed, with swollen tip; no cerci; minute to small insects . . . . THYSANOPTERA.

Wings broader and provided with numerous veins (if somewhat linear with reduced neuration, the tarsi with more than two joints and last tarsal joint not swollen); wings usually covered with scales, abdomen always scaled . . . LEPIDOPTERA.

Wings more or less broad, never very narrow; neuration reduced; no scales on wings or abdomen . . HOMOPTERA.

33. Parasitic on mammals or birds 34

Not parasitic on mammals or birds 38

34. Body strongly compressed laterally; jumping insects (Fleas) . . SIPHONAPTERA.

Body not compressed laterally, more or less flattened; unable to jump 35

35. Mouth with biting jaws . . . ANOPLURA (Mallophaga).

Mouth with sucking beak 36

36. Antennæ exserted, visible, though rather short 37

Antennæ inserted in pits, not visible from above . . . . . PUPIPAROUS DIPTERA.

37. Beak not jointed; tarsi specially modified into hooks for grasping hairs of host, permanent parasites . . ANOPLURA (Pediculoida).

Beak jointed; tarsi not specially modified; temporary parasites (Bedbugs) . . . . . HEMIPTERA.

38. Mouthparts formed for biting 39

Mouthparts formed for sucking 50

39. Abdomen terminated by strong moveable forceps . . . . . DERMAPTERA.
Abdomen not ending in forceps 40
40. Abdomen strongly constricted at base; prothorax fused with metathorax (Ants, etc.) . . . . . HYMENOPTERA.
Abdomen not strongly constricted at base, broadly joined to the thorax 41
41. Very minute louse-like jumping insects; prothorax inconspicuous, vertex of head divided into two parts by a longitudinal suture tarsi with 2 or 3 joints. (Book-lice) . . . PSOCINA.
Larger or at least not louse-like insects; prothorax larger; vertex or head not divided into two parts by a longitudinal suture; tarsi usually with more than 3 joints 42
42. Hindlegs enlarged for jumping, the femora enlarged . . . . ORTHOPTERA.
Hindlegs not enlarged for jumping 43
43. Prothorax much longer than mesothorax; front legs modified for grasping prey . . . . . MANTOIDA.
Prothorax not greatly lengthened; front legs not modified for grasping prey 44
44. No cerci; body often hard-shelled; antennæ usually 11-jointed . . COLEOPTERA.
Cerci present; antennæ usually with over 15-joints, often with very many joints 45
45. Cerci with more than 3 joints 46
Cerci short, with one to 3 joints. 47
46. Coxæ greatly enlarged; body flattened; antennæ long, tapering. (Cockroaches) . . . . . BLATTOIDA.
Coxæ not greatly enlarged; body not flattened; antennæ moderate, not tapering (a few primitive Termites) . . . . . ISOPTERA.

47. Tarsi 5-jointed; body very elongate, usually slender . . . . . PHASMOIDA.
Tarsi with 2 to 4 joints; body not very elongate 48
48. Front tarsus with first joint swollen and containing a silk-spinning organ EMBIADINA.
Front tarsus not swollen 49
49. Tarsi apparently 4-jointed; cerci with more than one joint; antennæ with 9 to over 30 joints (Termites) . ISOPTERA.
Tarsi 2-jointed; cerci one-jointed: antennæ 9-jointed . . . ZORAPTERA.
50. Body densely clothed with hairs or scales; proboscis if present coiled under the head (Moths) . . LEPIDOPTERA.
Body bare or with few scattered hairs 51
51. Last tarsal joint swollen and with no claws . . . . . THYSANOPTERA.
Last tarsal joint not swollen and with distinct claws 52
52. Prothorax small, hidden when viewed from above . . . . . DIPTERA.
Prothorax distinct 53
53. Beak arising from front part of head . HEMIPTERA.
Beak arising from back part of head . HOMOPTERA.

1. MACHILOIDA. (Plate I.)

A single Family . . . . MACHILIDÆ.

2. THYSANURA. (Plate I.)

A single Family . . . . LEPISMATIDÆ.

3. PROTURA. (Plate II.)

A single Family in India . . . PROTAPTERIDÆ.

4. CAMPODEOIDA.

1. Eleventh tergite nearly or quite covered by tenth; cerci jointed; anal valves very distinct	CAMPODEIDÆ.
Eleventh tergite fused with tenth; cerci single-jointed, forming strong forceps; anal valves not distinct .	JAPYGIDÆ.

5. COLLEMBOLA. (Plates I. III.)

1. Abdomen sub-globular with the segmentation obliterated. Tracheal system developed	SMYNTHURIDÆ.
Abdomen elongate, segmentation well-marked, occasionally the fifth and sixth or the fourth, fifth and sixth segments partially fused; fourth abdominal segment often much lengthened. Tracheal system wanting	2
2. Prothorax well developed, with definite tergum, bearing bristles. Cuticle usually granulated. Furcula attached to ante-penultimate abdominal segment	PODURIDÆ.
Prothorax much reduced, its tergum undeveloped. Cuticle not granulated. Furcula attached to penultimate abdominal segment . .	ENTOMOBRYIDÆ.

6. EPHEMEROIDA.

1. In forewing the upper cubital branch (Cu. 1) and the anal vein l diverge very strongly at the base; hind-tarsus with only four (often still fewer) freely movable joints (if a fifth joint is present it is closely connected with the tarsus and immovable) (Ephemeroidea)	2

In forewing the upper cubital vein and anal vein 1 run parallel at the base (rarely weakly divergent) 5

2. In forewing the subcosta is concealed in a fold of the membrane under the Radius and is not visible apically, only distinct at the base; the branches of Radius and Media evenly approached to one another; both wings dull, at most translucent; legs of female short and weak; tibiæ and tarsi of male transversely grooved; both sexes with only two anal bristles; genital claspers three-jointed (exceptionally with more than two end-joints), basal joint long . . . . . PALINGENIADÆ.

In forewing the subcosta distinct throughout, fully developed 3

3. Both wings at most translucent, in male slightly shining, in female wholly dull; no disconnected veins between spaces at hindmargin of wings; legs weak, foreleg of male often long, hindleg always short and weak . . . . . POLYMITARCIDÆ.

Both wings transparent, shining; on hind margin, especially of hindwing, many short disconnected veins between spaces; legs robust, always functional 4

4. In forewing anal-vein 1 not forked but connected with wing-margin by many to numerous cross-veins; in hindwing the inner fork of the sector (R_2+R_4) much longer than its stalk; genital claspers with short basal joint, the second joint longest . EPHEMERIDÆ.

In forewing anal-vein 1 is forked once, cross-veins to wing-margin wanting; in hindwing the inner fork of sector shorter than, or at the most as long

as, its stalk ; genital claspers without short basal joint, the first joint longest . . . . . POTAMANTHIDÆ.

5. Hind-tarsus with only four freely-movable joints (if a fifth joint is present, it is closely connected with the tarsus and is immovable) (Baëtoidea) 6

Hind-tarsus with five freely-movable joints (Heptagenioidea) 9

6. In forewing Media not forked ; M_1 also simple ; beyond M_1 occurs a disconnected supplementary nervure and beyond this a second which meets M_2 but does not arise from M_1 ; forewing usually with only small cross-veins ; hindwing very small and slender, with only 2 or 3 longitudinal veins, or wholly wanting ; wings pellucid . . . BAËTIDÆ.

In forewing the Media is distinctly forked 7

7. Wings clouded with milky or dark colouring, ciliated on hindmargin ; hindwing wanting (only sometimes present in sub-imago) ; no disconnected supplementary nervures, often with only a few cross-veins ; small species . . . . CÆNIDÆ.

Wings pellucid ; hindwing present (occasionally wanting) ; wings with numerous cross-veins 8

8. In forewing Anal-vein 1 at base remote from Anal-vein 2, the latter near Anal-vein 3 : between lower branch of Cubitus (Cu 2) and Anal-vein 1 no disconnected supplemetary veins likewise between the long supplementary vein and lower branch of Cubitus ; genital claspers (almost without exception) with two short

terminal joints, the anterior the longer . . . . . LEPTOPHLEBIADÆ.

In forewing at base Anal-vein 1 close to Anal-vein 2, the latter remote from Anal-vein 3, between lower branch of Cubitus (Cu 2) and Anal-vein 1, also between the long supplementary vein and the lower branch of Cubitus, also in inner half of fork of Cubitus, there are several (usually two) disconnected supplementary veins; genital-claspers with only one short terminal-joint, the anterior the longer . . . . . EPHEMERELLIDÆ.

9. In anal-space 1 of forewing many to numerous supplementary veins which run bent in an S-shape from Anal-vein 1 to wing-margin and of these some are forked, often with disconnected shorter supplementary veins between the connected ones; pronotum well developed . . SIPHLONURIDÆ.

In anal-space 1 of forewing no bent S-shaped connected supplementary veins, but two pairs of long supplementary veins, of which the longer pair always lies near Anal-vein 2; two anal bristles . . . . . ECDYONURIDÆ.

7. ODONATA.

1. F. w. and h. w. dissimilar, wings held more or less horizontally open (occasionally depressed or erected but never touching) when at rest, the h. w. much broader at base than f. w.; eyes touching or separated, more often touching one another; discoidal cell triangular, often differing in shape in the f. w. and h. w.;

male with two superior anal appendages, the inferior appendages usually fused into one (Anisoptera) 2

F. w. and h. w. essentially similar, h. w. sometimes broader than f. w. but never broadened at base ; wings held folded together over the back when at rest (except in *Philoganga* and some Lestidæ when they are held open) ; eyes always well separated ; the discoidal cell a regular or irregular quadrilateral, entire or traversed by several nervures, sometimes pointed externally but always four-sided ; male with two superior and two inferior anal appendages 3

2. Trigones of f. w. and h. w. similar or nearly similar in shape and placed at equal distances from the arc ; antenodal nervures of first and second series not corresponding (except for occasional individuals) ; labium with middle lobe about equal in size to lateral lobes and not overlapped by them ; ocelli arranged in a transverse line in front of vesicle . ÆSHNIDÆ.

Trigones of f. w. and h. w. dissimilar in shape and placed at unequal distances from the arc ; antenodal nervures of first and second nervures corresponding ; labium with a small median lobe and two broad lateral lobes overlapping it ; ocelli arranged in a triangle around the vesicle . LIBELLULIDÆ.

3. Area between M_1 and Cu_1 just beyond MA as broad as that between Cu_1 and posterior margin of wing. Quadrangle of h. w. and that of f. w. quite different in shape, the former twice as wide distally as proximally. Sectors of wing (except $M_1 a$) zigzag (Anisozygoptera) . . EPIOPHLEBIADÆ.

Area between M_4 and Cu_1 just beyond MA generally narrower than that between Cu_1 and the posterior margin of wing. Quadrangle of f. w. of the same general shape as that of h. w.; one may be longer than the other, but if one is widened distally, both are. Sectors of the wing tend usually to be continuous veins, not broken nor zigzag (Zygoptera) 4

4. Antenodal cross-veins 5 or more. Nodus usually more than one-third the distance from base of wing to apex. Quadrangle often crossed . AGRIONIDÆ.

Ante-nodal crossveins two (rarely three to five). Nodus usually from one-fifth to one-third of distance from base of wing to apex. Quadrangle not crossed 5

5. Stigma narrow and elongate. M_3 arising nearer arculus than subnodus. Usually resting with wings held wide open . . . . . LESTIDÆ.

Stigma very short, diamond-shaped or squarish. M_3 arriving nearer subnodus than arculus. All species resting with wings folded together over the back . . . . . ŒNAGRIONIDÆ.

8. EMBIADINA.

Vein R 4+5 (or more rarely R 2+3) is forked in both wings or at any rate in hindwing . . . . . EMBIADÆ.

Radius with both branches unforked in both wings . . . . . OLIGOTOMIDÆ.

9. PLECOPTERA.

Mandibles reduced to a weak lamina; clypeus and labrum hidden beneath

frontal shelf ; last joint of tarsi much longer than 1+2 . . . . . PERLIDÆ.

Mandibles, clypeus and labrum normal ; last tarsal joint not longer than 1+2 ; in f. w. 3 A is forked; cerci vestigial, reduced to a single joint NEMOURIDÆ.

10. ISOPTERA.

1. Clypeus not divided by median line ; radial sector with one or more superior branches (rarely more) ; fontanelle absent ; gula longer than broad . . . . . KALOTERMITIDÆ.

Clypeus divided by a median line ; radial sector without superior branches ; fontanelle present (sometimes indistinct) ; gula as broad as long . . . . . TERMITIDÆ.

11. BLATTOIDA.

1. Middle and hind femora armed beneath along one or both margins with two or more distinct spines 2

Lower margins of mid and hind femora unarmed or armed with hairs and bristles only, or with one or two apical or subapical spines 5

2. Last ventral abdominal segment (subgenital plate) of female divided posteriorly and modified to form a valvular apparatus . . . BLATTIDÆ (Periplanetidæ).

Last ventral abdominal segment large, simple, semi-orbicular 3

3. Supra-anal lamina (tenth dorsal plate) in both sexes usually transverse, narrow. Hindwings (when present) with an apical field, ulnar vein simple or bifurcate. Posterior femur usually sparsely armed with spines beneath . . . . . ECTOBIADÆ.

Supra-anal lamina in both sexes more or less produced, triangular, or emarginate. Hindwing (when present) with or without triangular apical field, ulnar vein ramose. Posterior femur usually strongly spined beneath 4

4. Supra-anal lamina of both sexes triangular, entire, the cerci projecting considerably beyond this lamina. Tarsi without pulvilli . . . . PSEUDOMOPIDÆ (Phyllodromiadæ).

Supra-anal lamina in male more or less quadrate, with obtuse angles, in female broadly rounded or lobate, the cerci not projecting beyond this lamina. Tarsi with distinct pulvilli . . . . . PHORASPIDIDÆ (Epilampridæ).

5. Supra-anal lamina in both sexes more or less produced, its posterior margin notched 6

Supra-anal lamina in both sexes short, transverse, its posterior margin straight or rounded 7

6. Claws with a distinct arolium . . PANCHLORIDÆ.

Claws without or with only a minute arolium . . . . . CORYDIADÆ.

7. Subgenital lamina in male very small, without styles. Claws without arolia . . . . . PANESTHIADÆ.

Subgenital lamina in male somewhat produced, furnished with a single style. Claws with a distinct arolium 8

8. Anterior part of the hindwing pointed or with much produced apical field or twice as long as forewing, folded in repose . . . . . OXYHALOADÆ.

Anterior part of hindwing rounded, with no apical field . . . PERISPHERIDÆ.

12. MANTOIDA.

1. Fore tibia with the outer edge unarmed beneath or at the most furnished with very minute tubercles. Pronotum not longer than fore coxa . . . . . PERLAMANTIDÆ (Amorphoscelidæ).

Fore tibia with the outer margin spinulose beneath 2

2. Fore femur beneath with the inner edge armed between the longer spines with shorter spines usually three in number. Antenna of male bipectinate. Vertex produced into a cone . . . . . EMPUSIDÆ.

Fore femur with the inner edge armed beneath with spines which are equal or with only the alternate ones smaller. Antenna of male simple, rarely unipectinate 3

3. Tibiæ as well as mid and hind femora carinate above. Pronotum elongate, with the posterior part, behind the transverse groove, almost thrice as long as the anterior part . . VATIDÆ.

Tibiæ and also the mid and hind femora even above 4

4. Legs or body appendiculate (*i.e.*, furnished with lobes). Hind femur or segments of abdomen with lobes, or vertex of head produced conoidally 5

Legs or body not appendiculate. Antennæ simple in both sexes 6

5. Body robust. Pronotum shorter than fore coxæ; fore tibia with numerous external spines very crowded together and procumbent, fore-femur with 3 or 4 discoidal spines and 4 external spines; hind femur lobate or not . . . . . HYMENOPODIDÆ (Creobotridæ: Harpagidæ).

Body small, slender in male, squat in female; eyes rounded; pronotum little shorter than fore coxæ, more or less oval, or roundish, armed with conical tubercles on disc; wings well developed in male, less so in female, which may be apterous; fore femur with 4 discoidal spines and 1 or 5 external spines; fore tibia with 6 or 7 external spines; supra-anal lamina transverse, rounded; cerci conical . . . . . OXYPILIDÆ.

6. Pronotum dilated above the insertion of coxæ, its lateral margins in this place broadened in a round manner, its anterior margin rounded . . MANTIDÆ.*

Pronotum not forming any dilatation above the insertion of the coxæ, its lateral margins straight or strongly dilated with the anterior margin not rounded . . . . . .

7. Pronotum strongly dilated, its sides rounded or subangulate, anterior margin acutely emarginate . . CHŒRADODIDÆ.

Pronotum linear, equally broad everywhere. All species coloured grey or coppery. Fore tibia armed with spines of various number on both sides; mid and hind tibia not carinate; fore-femur armed on inner side with spines, alternately one large and one small; pronotum not visibly narrowed anteriorly at insertion of coxæ and hence without a true neck; in many cases the lateral margins of the pronotum are parallel or nearly so; in other cases, especially in *Humbertiella*, the margins diverge

*NOTE.—Giglio-Tos has recently divided several groups from the Mantidæ but the characters given are not sufficiently explicit to enable them to be included in this Key and for the present these groups may be regarded as Sub-families of Mantidæ. These Sub-families are the Iridopteryginæ, Photininæ, Sibyllinæ and Amelinæ.

towards the head and hence the pronotum assumes nearly the shape of an heraldic shield; tarsi with five joints . . . . EREMIAPHILIDÆ.

13. DERMAPTERA.

1. Last dorsal segment of abdomen produced between the forceps into a depressed and dilated lobe, formed by a fusion with the pygidium. Body very strongly flattened; antenna with over 40 joints; f. w. with anterior portion of dorsum reduced, exposing mesonotum . . . APACHYIDÆ.
   Last dorsal segment of abdomen not strongly produced and forming no prominent process 2
2. Second tarsal joint lobed . . . FORFICULIDÆ.
   Second tarsal joint not lobed, simple, cylindrical 3
3. Last dorsal segment deflexed between the forceps, fused with pygidium which thus presents a vertical face . . . . . LABIDURIDÆ.
   Last dorsal segment with posterior margin entire, not fused with pygidium which is free 4
4. Femora compressed and keeled . . PYGIDICRANIDÆ.
   Femora not compressed or keeled . LABIIDÆ.

14. PHASMOIDA. (Plates IV, V.)

1. The four posterior tibiæ with an impressed triangular apical area 2
   The four posterior tibiæ with no impressed triangular apical area 5
2. Median segment distinctly shorter than metanotum, often much shorter. Apterous . . . . OBRIMIDÆ.

Median segment longer than metanotum or subequal to it. Often winged 3

3. Antennæ in male elongate, in female very short. Mesonotum quadrate or transverse. Forewings in female covering most of the abdomen. Lateral margin of abdomen entire and strongly dilated in form of a leaf . . . . . PHYLLIDÆ.

Antennæ equal in both sexes, elongate. Mesonotum longer than broad. Forewings in female (if present) shortened. Abdomen with lateral margins not entire nor dilated in form of a leaf 4

4. Claws minutely pectinated. Forewings (if present) filiform or stipuliform (*i.e.*, thread-like or bud-like) . . . ASCIPHASMIDÆ (Asciphasmidæ).

Claws smooth. Forewings (if present) lobiform, very rarely filiform . HETEROPTERYGIDÆ.

5. Median segment much shorter than metanotum, transverse or little longer than broad. Apterous 6

Median segment longer than metanotum or equally long or at least much longer than broad. Often winged 7

6. Antenna distinctly shorter than fore leg CLITUMNIDÆ.

Antenna longer than fore leg or at least as long . . . . LONCHODIDÆ.

7. Antenna shorter than fore leg or little longer 8

Antenna slender, indistinctly jointed, much longer than fore leg . . NECROSCIADÆ.

8. Fore femur not armed above or equally dentate on both sides or not triangular . . . . . PHIBALOSOMATIDÆ.

Fore femur triangular, armed with spinose teeth above on the inner side only or more strongly on the inner side. Cerci often large, leaf-shaped. ACROPHYLLIDÆ.

15. ORTHOPTERA.

1.	Antenna much longer than body, filamentous, delicately tapering	2
	Antenna almost always shorter than body, generally much shorter than body, generally thread-like and never distinctly tapering	4
2.	Tarsi 3-jointed	GRYLLIDÆ.
	Tarsi 4-jointed	3
3.	Auditory organ always present near base of fore-tibia; a stridulating organ usually present on wings .	TETTIGONIADÆ.
	No auditory organ, and no stridulating organ on wings	GRYLLACRIDÆ.
4.	Fore-tibia enlarged and fitted for burrowing	5
	Fore tibia not enlarged, fitted for walking, not specially modified for burrowing	6
5.	Three small ocelli; front tibia scarcely dilated, but with three or four strong spines at apex; hind femur greatly enlarged; tarsi one-or two-jointed, the second joint minute, compressed; species less than 20 mm. in length	TRIDACTYLIDÆ.
	Two large ocelli; front tibia dilated, its outer edge strongly toothed, hind femur scarcely enlarged; tarsi 3-jointed; over 25 mm. in length	GRYLLOTALPIDÆ.
6.	Claws without arolium (pad) between them; pronotum extending over the abdomen; f. w. vestigial, consisting of small scales at the base of the usually large hindwings . . .	ACRYDIDÆ.
	Claws with a pad (arolium) beneath and between them; pronotum at most extending over only extreme base of abdomen; forewing usually well developed	ACRIDIDÆ.

16. THYSANOPTERA.

1. Female with an ovipositor, formed from two pairs of gonapophyses, arising from 8th and 9th abdominal segments; last abdominal segment rarely tubular, in female beneath lengthwise separated and usually conical, in male usually bluntly rounded, never tubular. Wings microscopically haired; forewing with marginal vein and at least one longitudinal vein reaching apex (Terebrantia) 2

   Female without ovipositor; last abdominal segment in both sexes beneath always closed, usually tubular. Wings not setaceons, forewing with a single, simple, shortened middle-vein, (Tubulifera) 4

2. Ovipositor bent upwards. Wing broad and rounded at tip. Body not depressed. Antenna 9-jointed . . ÆOLOTHRIPIDÆ.

   Ovipositor bent downwards. Wing narrow, usually pointed at tip. Body more or less depressed. Antenna with 6 to 8 (only exceptionally 9)joints 3

3. Last abdominal segment in female conical, not strongly chitinized, rarely more strongly than preceding segments; bristles on 9th and 10th segments not extraordinarily long and robust, never spinous . . THRIPIDÆ.

   Last abdominal segment in female cylindrical, very strongly chitinized; bristles of 9th and 10th segments extraordinarily long and robust, spinous PANCHÆTOTHRIPIDÆ.

4. Tube considerably elongated, 3 or 4 times as long as the head and almost as long as all the remaining segments together . . . . . HYSTRICOTHRIPIDÆ.

Tube much shorter than the remaining segments together 5

5. Third antennal joint on distal part with a cincture of strong sensory pegs . ECACANTHOTHRIPIDÆ.

Sensory pegs of third antennal joint not more strongly developed than on other joints 6

6. Sixth abdominal segment at least in male with a strong horn-shaped appendage on each side . . MEGATHRIPIDÆ.

Sixth abdominal segment in male without such 7

7. The anterior ocellus not more widely separated from both the lateral ones than these are from one another. Head in front not produced above the eyes; vertex not sharply conical, rarely projecting above the root of antenna . . . . . PHLOEOTHRIPIDÆ.

Anterior ocellus more widely separated from both the lateral ones than these are from one another. Head in front more or less produced above the eyes; vertex conical, usually projecting above root of antenna, reaching to summit of anterior ocellus, and usually with a strong bristle in front near the eye . . IDOLOTHRIPIDÆ.

17. ZORAPTERA.

A single Family . . . ZOROTYPIDÆ.

18. PSOCINA. (Plate VI)

1. Tarsi two-jointed in both adult and larva 2

Tarsi 3-jointed in adult, two jointed in larva 3

2. Cubital loop of f. w. absent, or, if present, not touching or connected with M above it (fig. 1) . . . . CÆCILIIDÆ.

Cubital loop of f. w. present, either joined to M above it by a cross-vein, or just touching M, or fused with M for a greater or less distance (fig. 2). . . . . PSOCIDÆ.

3. Meso and meta-thorax completely fused together; imago absolutely without wings (fig. 3) . . . . . TROCTIDÆ.

Meso and meta-thorax separate; imago only rarely wingless 4

4. Imago wingless or at most with only very reduced f.w. and no h. w.; prothorax large and broad, visible from above 5

Imago winged, prothorax small 5

5. Claws with one tooth before apex. Antenna with more than 50 joints; long narrow scales on wing squamæ, on ends of femora and base of tibiæ, and shorter broader scales on dorsal surface of abdomen (fig. 4) . . . LEPIDILLIDÆ.

Antenna with less than 50 joints, no scales (fig. 5) Claws not toothed . ATROPIDÆ.

6. F. w. Cu_2 and 1 A not ending in one point, antennæ with more than 13 joints (fig. 6 . . . . . LEPIDOPSOCIDÆ.

F. w. Cu_2 and 1 A ending in one point, antennæ with 13 joints 7

7. Wings with numerous fine and short hairs between the scales (fig. 7) . AMPHIENTOMIDÆ.

No scales or hairs on body or wings 8

8. Cubital loop of f. w. not touching M above it (fig. 8) . . . . . MESOPSOCIDÆ.

Cubital loop of f. w. either just touching M or fusing with M for a short distance (fig. 9) . . . . . MYOPSOCIDÆ.

19. ANOPLURA (MALLOPHAGA). (Plate VII)

1. Antenna filiform, exposed, 3- or 5-jointed; mandibles vertical; meso-

and meta-thoracic segments usually fused. (Ischnocera) 2

Antenna clavate or capitate, concealed, 4-jointed; mandibles horizontal; meso- and meta-thoracic segments with sutural line usually visible (Amblycera) 3

2. Antenna 3-jointed; tarsi with one claw; infesting mammals . . TRICHODECTIDÆ.

Antenna 5-jointed; tarsi with two claws; infesting birds . . . PHILOPTERIDÆ.

3. Tarsi with one claw; infesting guinea-pigs and marmots . . . GYROPIDÆ

Tarsi with two claws; infesting birds 4

4. With six pairs of abdominal stigmata (on segments 2 to 7) . . . RICINIDÆ.

With six pairs of abdominal stigmata (on segments 3 to 8) 5

5. Ocular emargination distinct, more or less deep . . . . . LÆMOBOTHRIIDÆ

Ocular emargination absent or very slight . . . . . MENOPONIDÆ.

19. ANOPLURA (PEDICULINA). (Plate VII)

1. Legs not formed for clinging. Tibiæ without thumb-like process. Tibia and tarsus very long and slender. Head anteriorly with a long tubular extension at the apex of which the mouth opening is situated . . HÆMATOMYZIDÆ.

Legs formed for clinging. Tibia with a thumb-like process. Tibia and tarsus usually very short and thick. Head anteriorly without tubular extension 2

2. Proboscis short, barely reaching the thorax. Eyes large, prominent, and distinctly pigmented . . . PEDICULIDÆ.

Proboscis very long, sometimes extending backwards to the anterior part of the thorax. Eyes rudimentary or wanting . . . HÆMATOPINIDÆ.

20. HOMOPTERA.

1. Tarsi 3-jointed; antenna very short, with a small terminal bristle; rostrum plainly arising from head; active free-living species 2

Tarsi two or one-jointed; antenna usually well developed, sometimes absent, without conspicuous terminal bristle; rostrum appearing to arise between the front legs, sometimes absent in the male; female sex often inactive or incapable of moving 21

2. Three ocelli, placed on disc of vertex; antenna with short basal joint, terminated by a bristly process divided into about five joints; front femur thickened and usually spined beneath; male with a sound-producing organ on each side at base of abdomen; fairly large or very large species . . . . . CICADIDÆ.

Two ocelli (rarely three or more or entirely absent) 3

3. Ocelli placed beneath or near the eyes, usually in cavities of the cheeks; pronotum neither armed nor unusually developed. (Fulgoroidea) 4

Ocelli (rarely absent) placed between the eyes, on the vertex, on the front or on the front margin of the head 19

4. Antennal flagellum segmented. No mobile spur on hind tibiæ. Lateral ocelli not outside the lateral carinæ of frons; loræ plainly visible in full

view forming a continuous curve with clypeus . . . . . TETTIGOMETRIDÆ.

Antennal flagellum not segmented. Lateral ocelli outside the lateral carinæ of frons, generally beneath the eyes; loræ not visible in full view or forming an angle with clypeus 5

5. Hind tibiæ with a mobile spur at apex. Tegmina without a costal area . DELPHACIDÆ.

Hind tibiæ without a mobile spur 6

6. Three ocelli present . . . . . CIXIIDÆ (part).

Two or no ocelli 7

7. Posterior angle of mesonotum restricted off by a groove or fine line. Costal area present or absent . . TROPIDUCHIDÆ.

Posterior angle of mesonotum not restricted off by a groove or fine line 8

8. Anal area of wings reticulate. Lateral carinæ of frons continued onto clypeus. No costal area, or only a very narrow one without cross-veins. Clavus open, the Cu_2 (claval suture) and claval veins continuing to apical or hind margin and often branched . . . . . FULGORIDÆ.

Anal area of wings not reticulate, or, if so, then lateral carinæ of frons not continued onto clypeus 9

9. Face transverse or nearly as long as wide, lateral edges angular. Anal area of wings sometimes reticulate, in which case no lateral carinæ on clypeus. With or without costal area. Clavus often roundly closed; claval veins reaching apex of clavus the suture (Cu_2) and claval veins continuing to the apical or hind margin, and sometimes branched . EURYBRACHIDÆ.

Lateral edges of face not angular, or, if so, then face distinctly longer than wide 10

Proboscis very long, sometimes extending backwards to the anterior part of the thorax. Eyes rudimentary or wanting . . . HÆMATOPINIDÆ.

20. HOMOPTERA.

1. Tarsi 3-jointed; antenna very short, with a small terminal bristle; rostrum plainly arising from head; active free-living species 2

Tarsi two or one-jointed; antenna usually well developed, sometimes absent, without conspicuous terminal bristle; rostrum appearing to arise between the front legs, sometimes absent in the male; female sex often inactive or incapable of moving 21

2. Three ocelli, placed on disc of vertex; antenna with short basal joint, terminated by a bristly process divided into about five joints; front femur thickened and usually spined beneath; male with a sound-producing organ on each side at base of abdomen; fairly large or very large species . . . . . CICADIDÆ.

Two ocelli (rarely three or more or entirely absent) 3

3. Ocelli placed beneath or near the eyes, usually in cavities of the cheeks; pronotum neither armed nor unusually developed. (Fulgoroidea) 4

Ocelli (rarely absent) placed between the eyes, on the vertex, on the front or on the front margin of the head 19

4. Antennal flagellum segmented. No mobile spur on hind tibiæ. Lateral ocelli not outside the lateral carinæ of frons; loræ plainly visible in full

view forming a continuous curve with clypeus . . . . . TETTIGOMETRIDÆ.

Antennal flagellum not segmented. Lateral ocelli outside the lateral carinæ of frons, generally beneath the eyes; loræ not visible in full view or forming an angle with clypeus 5

5. Hind tibiæ with a mobile spur at apex. Tegmina without a costal area . DELPHACIDÆ.

Hind tibiæ without a mobile spur 6

6. Three ocelli present . . . . . CIXIIDÆ (part).

Two or no ocelli 7

7. Posterior angle of mesonotum restricted off by a groove or fine line. Costal area present or absent . . TROPIDUCHIDÆ.

Posterior angle of mesonotum not restricted off by a groove or fine line 8

8. Anal area of wings reticulate. Lateral carinæ of frons continued onto clypeus. No costal area, or only a very narrow one without cross-veins. Clavus open, the Cu_2 (claval suture) and claval veins continuing to apical or hind margin and often branched . . . . . FULGORIDÆ.

Anal area of wings not reticulate, or, if so, then lateral carinæ of frons not continued onto clypeus 9

9. Face transverse or nearly as long as wide, lateral edges angular. Anal area of wings sometimes reticulate, in which case no lateral carinæ on clypeus. With or without costal area. Clavus often roundly closed; claval veins reaching apex of clavus the suture (Cu_2) and claval veins continuing to the apical or hind margin, and sometimes branched . EURYBRACHIDÆ.

Lateral edges of face not angular, or, if so, then face distinctly longer than wide 10

10.	Tegmina without a costal area, or with only a small one without transverse veins	11
	Tegmina with a distinct costal area with transverse veins	17
11.	Claval vein not entering apex of a closed clavus, but joining the commissure or suture before apex, or the clavus is open	12
	Claval vein entering apex of clavus	14
12.	Apical segment of labium short or very short (*Venata* an exception) . .	DERBIDÆ.
	Apical segment of labium much longer than wide, sometimes very long	13
13.	Sides of clypeus acute or with carinæ. Apart from the lateral edges, frons generally with two or three carinæ .	DICTYOPHARIDÆ.
	Apart from the lateral edges, the frons with not more than one (median) carina. Sides of clypeus rounded, without carinæ	CIXIIDÆ (part).
14.	Base of abdomen with one or more appendages bearing three hemispherical depressions . . .	ACHILIXIIDÆ.*
	Base of abdomen without lateral appendages	15
15.	Tegmina when at rest nearly horizontal or but slightly tectiform. Hind margin beyond clavus generally expanded, and when at rest overlap	ACHILIDÆ.
	Tegmina when at rest steeply tectiform; hind margin beyond clavus not expanded, and do not overlap when at rest	16
16.	Tegmina large, tectiform. Hind edge of pronotum slightly roundly emarginate; mesonotum large, long. No spines on hind tibiæ . .	AMPHISCEPIDÆ † (Acanaloniadæ).

* Not Indian.

† Not Indian but some genera are Malayan, so that this Family may be expected to be found in the Indian Region.

Tegmina generally smaller. Head as wide, or nearly as wide, as the thorax. Posterior edge of pronotum straight, rarely slightly concave; mesonotum short. Hind tibiæ with spines. Tegmina often coriaceous or subcoriaceous . . ISSIDÆ.

17. Clavus not granulate 18

Clavus granulate. Apex of clavus sometimes blunt and closed, sometimes open. Claval veins separate or jointed together at apex . . FLATIDÆ.

18. Head wider than pronotum, seldom a little narrower, sides of clypeus often without carinæ. Pronotum without carinæ or with an obscure median carina; mesonotum very large: front legs simple . . . . . RICANIADÆ.

Head narrower than pronotum. Sides of clypeus with carinæ. Pronotum with carinæ. Front legs expanded LOPHOPIDÆ.

19. Pronotum prolonged backwards into a hood or process of variable form usually extended over abdomen and much elevated; antennæ inserted between and in front of eyes . . MEMBRACIDÆ

Pronotum not prolonged over base of abdomen 20

20. Tibiæ smooth, hind tibia armed with one or two stout spines and an apical cluster of spinules; ocelli placed on vertex, rarely absent . CERCOPIDÆ

Hind tibia with a double series of spines beneath: ocelli variable in position, rarely absent, usually placed in front margin of head almost in a line with front of eyes. JASSIDÆ

21. Tarsi two-jointed, the basal joint occasionally reduced, terminal joint with two claws; wings, when present, four in number: sutures between body-segments distinct.

mouth-parts usually well developed in both sexes, labium usually long; nymphs sometimes scale-like, legless and immovable but, if so, abdomen always provided with vasiform orifice 22

Tarsi one-jointed, with a single claw; wings, when present (males only) a single pair (the forewings only, the hindwings aborted); females always wingless, often without legs and scale-like, grub-like or gall-like so that they rarely move after maturity, remaining fixed to their host-plant; rostrum wanting in adult males, in female very short; sutures between body-segments of female often indistinct; abdomen never provided with a vasiform orifice 4

22. Legs with thickened femora; antenna long, with five to ten joints, last joint with two fine apical bristles; f.w. rather thicker than h.w., sometimes more or less coriaceous; pad between tarsal claws, prominent, bilobed . . . . . PSYLLIDÆ.

Legs long and slender; wings of more or less similar consistency; antenna with 3 to 6 joints 23

23. Wings membranous and rarely absent in adult, usually opaque; body more or less covered with white waxy powder; a pad-shaped or spine-like process between the tarsal claws . . . . . ALEYRODIDÆ.

Wings transparent though sometimes coloured, and often absent; body not covered with white waxy powder but occasionally with waxy filaments, threads or tufts; process between tarsal claws absent or nearly so . . . . . APHIDIDÆ.

24.	Insects enclosed in a resinous cell with three orifices; adult female apodous with the mouthparts at one end and at the other end three tubular projections, one bearing the anus and the other two the mesothoracic spiracles, with an associated dorsal spine-like projection, legs wanting; male with simple eyes, either winged or apterous, both forms usually occurring in the same species	LACCIFERIDÆ (Tachardiadæ).
	Insects not enclosed in a resinous cell; adult female with legs or apodous, but without anal spine; male with simple or compound eyes, usually winged (always winged in Indian species, so far as known)	COCCIDÆ.

21. HEMIPTERA.

1.	Antenna conspicuous, capable of being moved about freely in front of head	2
	Antenna more or less concealed, either situated on the underside of the head, to which it is closely adpressed, or in a fovea beneath the head, apex of second segment never extending as far as apex of head	26
2.	Abdomen clothed beneath with silvery velvety pubescence (aquatic or subaquatic species)	3
	Abdomen not clothed beneath with silvery velvety pubescence (not aquatic and rarely (Saldidæ) subaquatic species)	7
3.	Antenna five-jointed	NÆOGÆIDÆ (Hebridæ).
	Antenna four-jointed.	4
4.	Coxæ contiguous or nearly contiguous; scutellum visible	MESOVELIADÆ.
	Coxæ widely separated; scutellum covered	5

5. Head much elongated in front of eyes, many times longer than broad . HYDROMETRIDÆ.
Head not elongated, as wide across eyes as long 6
6. Posterior femora not reaching apex of abdomen . . . . . VELIADÆ.
Posterior femora long and slender, reaching far beyond apex of abdomen . . . . . GERRIDÆ.
7. Scutellum reaching at least to base of membrane, or at least half as long as abdomen, sometimes covering the whole abdomen and anal appendages 8
Scutellum not reaching to base of membrane nor to middle of abdomen 11
8. F.w. longer than body, folded in at base of membrane . . . PLATASPIDIDÆ.
F.w. straight, not folded in at base of membrane 9
9. Scutellum convex and very large, nearly or quite covering abdomen and also covering whole of f.w. except extreme base of outer margin; h.w. with hamus (a heavy abrupt spur-like vein) . . . SCUTELLERIDÆ.
Scutellum large, but not covering outer margin of corium. Hamus usually absent . . . . GRAPHOSOMATIDÆ.
Scutellum moderate, corium always exposed. Hamus usually absent 10
10. Basal ventral segment almost completely covered by metasternum; scutellum variable in size and shape CYDNIDÆ.
Spiracles of basal ventral segment hidden by posterior margin of metasternum . . . . . PENTATOMIDÆ.
11. Tarsi in adult apparently 4-jointed, really 3-jointed but the second segment divided by a pseudo-joint; wings reduced to short stumps;

eyes absent, mid and hind tibiæ with at least four pseudo-joints	POLYCTENIDÆ.	
Tarsi not 4-jointed		12
12. Mesopleura and metapleura composed of one piece only; f.w. without cuneus		13
Mesopleura and metapleura composed of several pieces; f.w. with cuneus		23
13. Tarsi 3-jointed		14
Tarsi 2-jointed		21
14. Rostrum not bent at base, in repose lying against lower surface of head		15
Rostrum short, bent at base so that in repose it does not lie against lower surface of head		18
15. Antenna usually elongate and 4-jointed, inserted on upper part of side of head		16
Antenna inserted below a line drawn from centre of eye to apex of face		17
16. Legs of moderate length; femoral apices not nodulosely clavate	COREIDÆ.	
Legs long and slender, femoral apices nodulosely clavate	BERYTIDÆ.	
17. Ocelli present	LYGÆIDÆ.	
Ocelli absent	PYRRHOCORIDÆ.	
18. Rostrum long; ocelli placed between the eyes	ACANTHIADÆ (Saldidæ).	
Rostrum short; ocelli, when present, placed behind the eyes		19
19. F.w. complete, membrane distinct. If apterous, large heavily built species		20
F.w. entirely membranous. Small species	HENICOCEPHALIDÆ.	
20. Rostrum 3-jointed	REDUVIIDÆ.	
Rostrum 4-jointed	NABIDIDÆ.	
21. Foreleg short and stout, with long coxa, short thick femur, and curved pointed tibia; frequently without tarsus	PHYMATIDÆ.	
Foreleg normal		22

22. F.w. more or less reticulate, consisting of strong irregular thick lines forming a network of cells. Forcleg inserted on posterior margin of prosternum . . . . . TINGITIDÆ.

F.w. neither reticulate nor cellular. Forcleg inserted on disc of prosternum 22a

22a. Tylus forming anterior projection of head; bucculæ forming a rostral sulcus; margin of body more or less simple or furnished with well separated irregular lobes . . ARADIDÆ.

Tylus at end of a deep incision extending caudally from anterior margin of head; bucculæ forming no appreciable rostral sulcus; margin of body furnished with lobes, separate or fused, which form a practically continuous lamina encircling the whole . TERMITAPHIDIDÆ.

23. F.w. with veins more or less areolately joined. Third antennal segment thickened towards base . . . DIPSOCORIDÆ (Ceratocombidæ).

F.w. with veins never areolately joined. Third antennal segment not thickened towards base. 24

24. Macropterous forms with f.w. without an embolium but with complete cuneus and with ocelli obscure (except in Isometopinæ). Head rarely produced horizontally . . . MIRIDÆ (Capsidæ).

Macropterous forms with f.w. with an embolium but with incomplete cuneus and ocelli well-developed. Head produced horizontally in front 25

25. Rarely brachypterous. Clypeus elongate. Ocelli present. Head not channelled beneath . . . ANTHOCORIDÆ.

Always strongly brachypterous, wings reduced to mere stumps. Head

more or less channelled beneath. Ocelli absent . . . . . CIMICIDÆ.

26. Body short and broad; head very broad, with prominent eyes; ocelli present; antenna free but second segment not extending as far as apex of head. Posterior legs thin, formed for running . . . OCHTHERIDÆ (Pelogonidæ).

Body elongate or ovate, head of moderate size. Antennæ concealed, usually in foveæ on underside of head 27

27. Forelegs inserted on or near the fore margin of prosternum 28

Forelegs inserted on hindmargin of prosternum 30

28. Antenna 3-jointed; last pair of abdominal spiracles siphunculate forming a long tubular appendage to abdomen . . . . . NEPIDÆ.

Antenna 4-jointed; last pair of abdominal spiracles not siphunculate 29

29. Antenna more or less simple. Legs not, or scarcely, flattened. Wings not reticulate . . . . . NAUCORIDÆ.

Antenna highly modified. Legs strongly flattened. Wings more or less reticulate . . . . . BELOSTOMATIDÆ.

30. Rostrum free, composed of 3 or 4 segments . . . . . NOTONECTIDÆ.

Rostrum concealed, apparently unjointed, or composed of two segments at most . . . . . CORIXIDÆ.

22. MEGALOPTERA (MEGANEUROPTERA).

A single Family in India . . . SIALIDÆ.

23. RAPHIDIOIDA.

A single Family . . . . . RAPHIDIADÆ.

24. NEUROPTERA.

1. Fore leg formed for seizing prey; prothorax long . . . . . MANTISPIDÆ.
   Fore leg not raptorial 2
2. Venation very reduced; no cross-veins between costa and subcosta; very small species, often covered with whitish powder; hindwing always smaller than forewing . . . . CONIOPTERYGIDÆ.
   Veins and cross-veins abundant; cross-veins always between costa and subcosta 3
3. Antenna clubbed 4
   Antenna not clubbed. 5
4. Antenna less than one-third length of forewing. In forewing, behind point of fusion of subcosta and radius, is an elongate cell of variable form but constant position . . . MYRMELEONIDÆ.
   Antenna more than half length of forewing. In forewing no greatly elongated cell behind point of fusion of subcosta and radius . . . ASCALAPHIDÆ.
5. Forewing triangular; hindwing long and narrow, at least twice length of forewing . . . . . NEMOPTERIDÆ.
   Not as above 6
6. Forewing very broad and rounded. Costal area usually wide. In forewing veins Sc, R_1 and R_2 run parallel to one another and all coalesce at apex . . . . . PSYCHOPSIDÆ.
   Not as above 7
7. Antenna thread-like, long 8
   Antenna moniliform or pectinate 9
8. Both wings approximately equal in breadth; a transverse veinlet near base of subcostal area; less than 30 cross-veins on costal area between base and stigma . . . . CHRYSOPIDÆ.

Hindwings only about $\frac{2}{3}$ breadth of forewing; no transverse veinlet near base of subcostal area; more than 40 cross-veins on costal area between base and stigma	APOCHRYSIDÆ.	
9. Ocelli absent; female with ovipositor	DILARIDÆ.	
Ocelli present; no ovipositor		10
10. Subcosta and radius coalesce apically		11
Subcosta and radius separate, although approximate		13
11. Media two-branched in both wings .	OSMYLIDÆ.	
Not as above		12
12. Costal area of forewing not greatly broadened. Humeral vein not recurrent nor branched . . .	SISYRIDÆ.	
Costal area of forewing distinctly broadened. In forewing R_{2+3} has become separated from remainder of radial sector and is attached separately to R_1; this results in radius having two sectors each of which is forked (*Annandalia*, *Notiobiella*) .	SYMPHEROBIIDÆ.	
13. Subcosta reaches margin of wing .		14
Terminal portion of subcosta atrophied so that it does not reach wing-margin; f.w. frequently falcate at apex	BEROTHIDÆ.	
14. R_1 coalesces with stem of pectinately-branched radial sector, so that stem of radial sector is suppressed. Marginal dots usually present . .	HEMEROBIIDÆ.	
R. separate from stem of radial sector. Marginal dots absent. (*Rapisma*) .	ITHONIDÆ.	

25. STREPSIPTERA (PLATE 8).

1. Female thoracic spiracles not usually discernible, never prominent. Male tarsi 3-jointed; prothorax sometimes invisible at sides. Male antenna 7-jointed, with third to sixth	

joints laterally produced, seventh elongate . . . . . HALICTOPHAGIDÆ.

Female thoracic spiracles more or less easily discernible, generally prominent. Male tarsi 4-jointed; prothorax and mesothorax short, transverse 2

2. Scutellum broadly rounded in front, shorter than praescutum; antenna 7-jointed, third joint laterally produced, fourth short, fifth to seventh joints elongate (Female unknown) . MYRMECOLACIDÆ.

Scutellum more or less broadly truncate, and pedunculate in front; praescutum not as broad as mesothorax at base; antenna 4-jointed, the third joint laterally produced, fourth elongate . . . . . XENIDÆ.

26. COLEOPTERA.

1. Venation of wings of Adephagid type (chiefly distinguished by presence of one or two cross-veins joining the two median veins, or by two transverse veins situated nearer to the base and joining the upper median or an irregular branch of the lower radial vein to the lower median, thus forming a usually very definite enclosed space, called the *areola oblonga*); antennæ filiform, often setaceous, rarely moniliform or irregular. (Adephaga) 2

Venation of wings of Staphylinid (no transverse veins and no enclosed spaces) or Cantharid type (chief characteristic is loop formed at some distance from apex by coalescence of two median veins, of which one is continued to margin from

apex of loop, but this loop is sometimes very small or practically absent). (Polymorpha) 10

Venation of wings chiefly Cantharid; antennal club lamellate. (Lamellicornia). 76

2. Abdomen with four visible ventral segments; antennæ with 2—11 joints, usually more or less abnormal; metasternum with an antecoxal suture extending almost across its breadth, slightly produced between posterior coxæ . . . PAUSSIDÆ.

Abdomen with five free ventral segments; antennæ 11-jointed; metasternum with a deep antecoxal suture, extending almost across its breadth, scarcely produced between posterior coxæ . . . . . CUPEDIDÆ.

Abdomen with 6 or 7 (rarely 8) visible ventral segments, the first three connate but with sutures apparent 3

3. Metasternum with a transverse suture before posterior coxæ 4

Metasternum without a transverse suture before posterior coxæ 8

4. Transverse suture before posterior coxæ extending across metasternum, which is continued behind in a triangular process between coxæ 5

Transverse suture of metasternum very short, only reaching across central portion; metasternum not prolonged between posterior coxæ 7

5. Posterior coxæ normal; antennæ 11-jointed 6

Posterior coxæ extended into two broad plates covering first three segments of abdomen; antennæ apparently 10-jointed, really 11-jointed but basal joint hidden . HALIPLIDÆ.

6. Clypeus extending on each side beyond base of antennæ . . . . CICINDELIDÆ.
Clypeus not extending on each side beyond base of antennæ . . CARABIDÆ.
7. Anterior coxæ conical; tibiæ and tarsi with swimming hairs . . . HYGROBIIDÆ.
Anterior coxæ globular; tibiæ and tarsi without swimming hairs . AMPHIZOIDÆ.
8. Posterior coxæ contiguous on their inner margin; metasternum slightly produced between them; legs natatorial 9
Posterior coxæ very widely separated; metasternum emarginate before them, very large, almost as long as the abdomen; antennæ moniliform; legs ambulatorial . . . . RHYSODIDÆ.
9. Eyes not divided; antennæ normal . DYTISCIDÆ.
Eyes completely divided; antennæ abnormal, very short . . . GYRINIDÆ.
10. Wings of Staphylinid type, without cross-veins or loop (Staphylinoida) 11
Wings of Cantharid type, but with venation very variable especially in the smaller forms 20
11. Elytra much abbreviated, leaving the greater part of abdomen exposed; dorsal segments of abdomen mostly corneous 12
Elytra covering, or almost entirely covering, abdomen; dorsal segments of abdomen (except where exposed at apex) membranous 13
12. Abdominal segments flexible: size very variable; tarsal joints nearly always more than three . . STAPHYLINIDÆ.
Abdominal segments partly connate; size, as a rule, very small; tarsi 3-jointed . . . . . PSELAPHIDÆ.
13. Antennæ not geniculate 14
Antennæ geniculate 19

14. Wings partly or entirely fringed with ciliate hairs; size very small 15
Wings without fringes of ciliate hairs 17
15. Posterior coxæ laminate; insects, as a rule, capable of rolling themselves into a ball . . . . . CLAMBIDÆ.
Posterior coxæ not laminate 16
16. Antennæ verticillate, with long hairs; wings with long fringes of hairs; tarsi 3-jointed; form almost always oblong . . . . . TRICHOPTERYGIDÆ.
Antennæ loosely clavate, without long hairs; wings with much shorter fringes of hairs, tarsi 4-jointed (third joint very small); form more or less hemispherical . . . . . CORYLOPHIDÆ.
17. Posterior coxæ slightly transverse, conical, small; eyes coarsely granulated; size, as a rule, very small . . SCYDMÆNIDÆ.
Posterior coxæ strongly transverse; eyes finely granulated (sometimes absent); size, as a rule, large or moderate 18
18. Posterior coxæ contiguous or only slightly separated. . . . SILPHIDÆ.
Posterior coxæ widely separated . SCAPHIDIIDÆ.
19. Head and mandibles normal; tarsi short . . . . . HISTERIDÆ.
Head very large, as long or nearly as long as prothorax; mandibles perpendicularly reflexed; tarsi very long and slender . . . . . NIPONIIDÆ.
20. Gular sutures and lateral sutures of prothorax distinct 21
Gular sutures and lateral sutures of prothorax obsolete; head usually (but not always, *e.g.* Anthribidæ and Scolytidæ) prolonged into a rostrum; tarsi pseudotetramerous or crypto-pentamerous, the fourth joint being very small and connate with fifth. (Rhynchophora) 72

21. Tarsi pseudo-tetramerous or crypto-pentamerous, the fourth joint being very small and connate with fifth. (Phytophaga)		69
Tarsi heteromerous, *i.e.*, with 5-5-4 joints respectively. (Heteromera)		54
Tarsi variable, with 1-5 joints, rarely heteromerous		22
22. Antennæ, as a general rule, serrate or filiform. (Serricornia)		41
Antennæ, as a general rule, clavate. (Clavicornia)		23
23. Maxillary palpi elongate, often much longer than antennæ; antennæ with 6 to 9 joints, terminating in a club; tarsi 5-jointed; habits aquatic or sub-aquatic	HYDROPHILIDÆ.	
Maxillary palpi not abnormally elongate		24
24. Antennæ sub-geniculate	SYNTELIADÆ.	
Antennæ not geniculate		25
25. Antennæ very short, scarcely as long as head, abnormal		26
Antennæ more or less elongate, clavate or filiform		27
26. Second antennal joint strongly developed, ear-shaped; habits aquatic or sub-aquatic	DRYOPIDÆ.	
Antennal joints 5-11 forming a very short oblong club; habits fossorial	HETEROCERIDÆ.	
27. Anterior coxæ with trochanters of front legs forming two plates which conceal the prosternum; tarsi short, 4-jointed; habits sub-aquatic	GEORYSSIDÆ.	
Anterior coxæ normal		28
28. Tarsi long, 5-jointed; claws strongly developed for clinging to stones in running water	ELMIDÆ.	
Tarsi and claws not strongly developed for clinging		29
29. Anterior coxæ with a free trochantin		30
Anterior coxæ without a free trochantin		34

30. Posterior coxæ not grooved or sulcate 31
Posterior coxæ grooved or sulcate for the reception of the femora 32

31. Tarsi 5-jointed, first joint very short, fourth normal . . . . . TROGOSITIDÆ.
Tarsi 5-jointed (rarely heteromerous), first joint not short, fourth very small . . . . . NITIDULIDÆ.

32. Legs not strongly retractile; form usually oblong . . . . . DERMESTIDÆ.
Legs very strongly retractile, capable of being drawn up entirely underneath the body; form oval or hemispherical, usually very convex 33

33. Head prominent; mentum large . NOSODENDRIDÆ.
Head sunk in prothorax; mentum small . . . . . BYRRHIDÆ

34. Tarsi 5-jointed, sometimes heteromerous in male (very rarely 4-jointed) 35
Tarsi all 3-jointed or apparently 3-jointed 38
Tarsi 4-jointed or with front tarsi of male 3-jointed (very rarely all 3-jointed) 39

35. Epimera of mesosternum reaching middle coxal cavities . . . CUCUJIDÆ.
Epimera of mesosternum not reaching middle coxal cavities 36

36. Tarsal claws toothed at base; form oval or elliptical and convex: small or very small and inconspicuous insects . . . . . PHALACRIDÆ.
Tarsal claws simple; shape and size very variable 37

37. Tarsi pseudo-tetramerous, 5-jointed, fourth joint small, hidden in the emargination of third joint; shape and size very variable . . . EROTYLIDÆ.
Tarsi plainly 5-jointed; small and inconspicuous insects, of more or less oblong form . . . . . CRYPTOPHAGIDÆ.

38. Elytra entire, covering the abdomen, ventral segments of abdomen nearly equal in length . . . . . LATHRIDIIDÆ.
Elytra truncate, leaving apex of abdomen uncovered; first and fifth ventral segments longer than others . MONOTOMIDÆ.

39. Tarsi in male with 3-4-4 joints, in female with 4-4-4 . . . . . MYCETOPHAGIDÆ.
Tarsi nearly always 4-jointed in both sexes, the third joint normal and free; abdomen with 5 ventral segments of which the first 3 or 4 are more or less connate . . . COLYDIIDÆ.
Tarsi nearly always pseudo-trimerous, 4-jointed, the third joint usually very small, hidden in the emargination of the second; abdomen with five free ventral segments 40

40. Epimera of mesosternum obliquely quadrilateral; antennæ inserted between the eyes; anterior coxal cavities either closed or open behind; tarsal claws simple . . ENDOMYCHIDÆ.
Epimera of mesosternum irregularly triangular, with the apex directed to the front; antennæ as a rule inserted at the inner front margin of the eyes; anterior coxal cavities nearly always closed behind; claws, as a rule, furnished with appendages or toothed. . . . . COCCINELLIDÆ.

41. Prosternum not prolonged behind the anterior coxæ (except slightly in certain Dascillidæ) 42
Prosternum produced behind the anterior coxæ and fitting into a groove on the mesosternum 52

42. Tarsi 5-jointed 43
Tarsi 4-jointed . . . . . CIOIDÆ.
Fore and mid tarsi 5-jointed, hind tarsi 4-jointed . . . . . SPHINDIDÆ.

43. First ventral segment not elongate 44
First ventral segment elongate; antennæ terminated by a 2-jointed club . . . . . LYCTIDÆ.
44. Onychium large and hairy; posterior coxæ sulcate; antennæ usually flabellate in male . . . . SANDALIDÆ (Rhipiceridæ).
Onychium small 45
45. Posterior coxæ sulcate for reception of femora 46
Posterior coxæ not sulcate 48
46. Posterior coxæ more or less dilated; epimera of mesosternum reaching the coxæ 47
Posterior coxæ not or scarcely dilated; epimera of mesosternum not reaching the coxæ . . . . ANOBIIDÆ (Ptinidæ).
47. Anterior coxæ with a large and distinct trochantin . . . . DASCILLIDÆ.
Anterior coxæ without trochantin . HELODIDÆ.
48. Epimera of mesosternum not reaching the coxæ; first tarsal joint very short, sometimes obsolete . . BOSTRYCHIDÆ.
Epimera of mesosternum reaching the coxæ 49
49. Posterior coxæ flat; tarsi with membranous lobes beneath . . . CLERIDÆ.
Posterior coxæ prominent; tarsi without membranous lobes 50
50. Anterior coxæ without trochantin; maxillary palpi in male (except very rarely) large and flabellate . . LYMEXYLONIDÆ.
Anterior coxæ with distinct trochantin 51
51. Abdomen with 7 or 8 ventral segments CANTHARIDÆ (Telephoridæ)
Abdomen with 6 (rarely 5) ventral segments . . . . . MELYRIDÆ.
52. First and second ventral segments connate; integument as a rule metallic, often very brilliant; larva

with anterior 3 or 4 segments much broader than the rest . . . BUPRESTIDÆ.

First and second ventral segments not connate; integument occasionally metallic but usually much less so than in Buprestidæ; larva more or less parallel-sided, rarely with the anterior segment a little broader than the rest 53

53. Anterior coxal cavities open behind, but entirely prosternal . . . ELATERIDÆ.

Anterior coxal cavities formed partly by the prosternum and partly by the mesosternum . . . . THROSCIDÆ.

54. Anterior coxal cavities closed behind 55

Anterior coxal cavities open behind 58

55. Tarsal claws simple 56

Tarsal claws pectinate . . . CISTELIDÆ.

56. Abdomen with 5 ventral segments, of which the first three are more or less closely connected 57

Abdomen with 5 free ventral segments OTHNIADÆ.

57. Anterior coxæ globose, rarely oval, not prominent; penultimate joint of tarsi very rarely bilobed and spongy pubescent beneath . . . TENEBRIONIDÆ.

Anterior coxæ conical or conical-ovate, prominent; penultimate joint of tarsi bilobed and spongy pubescent beneath . . . . . LAGRIADÆ.

58. Prothorax without sharply produced or strongly dentate margins; size moderate or small 59

Prothorax with the margins produced into sharp edges which are dentate: size very large; shape resembling that of a large Longicorn . . TRICTENOTOMIDÆ.

59. Head not strongly and suddenly constricted at base 60

Head strongly constricted at base 63

60. Middle coxæ not very prominent; antennæ received into grooves on prosternum 61
Middle coxæ very prominent; epipleuræ of elytra almost absent . ŒDEMERIDÆ.

61. Antenna inserted under the frontal margin and received in a groove on the underside of the prothorax, 11-jointed, the last three joints forming a club . . . . . MONOMMIDÆ.
Antenna inserted under small oblique frontal ridges, 11-(rarely 10-) jointed, filiform 62

62. Pronotum narrowed at base; the front of head often produced, sometimes forming a distinct rostrum . . . PYTHIDÆ.
Prothorax broad behind, front of head not produced . . . . MELANDRYIDÆ.

63. Prothorax at base not narrower than base of elytra 64
Prothorax at base plainly narrower than base of elytra 66

64. Lateral suture of prothorax distinct 65
Lateral suture of prothorax obsolete . RHIPIPHORIDÆ.

65. Posterior tibiæ as long as tarsi; tarsal claws with a rudimentary tooth at base; penultimate joint of tarsi strongly bilobed . . . . SCRAPTIADÆ.
Posterior tibiæ shorter than tarsi; tarsal claws usually plainly toothed; penultimate joint of tarsi simple . MORDELLIDÆ.

66. Tarsal claws split from base to apex . MELOIDÆ (Lyttidæ).
Tarsal claws not split 67

67. Antennæ serrate, subpectinate or ramose; size comparatively large; head exserted, horizontal or almost horizontal . . . . . PYROCHROIDÆ.
Antennæ filiform or moniliform (very rarely flabellate); size very small; head deflexed 68

68. Penultimate joint of tarsi minute, hidden within the lobes of the pre-

ceding joint which is strongly bilobed; head constricted immediately behind the eyes, which are large . XYLOPHILIDÆ.

Penultimate joint of tarsi not minute, bilobed; head constricted at some distance behind the eyes, which are moderate or small . . . ANTHICIDÆ.

69. Mentum pedunculate . . . LARIADÆ (Bruchidæ).

Mentum not pedunculate 70

70. Antennæ short or moderate, not inserted on frontal prominences; tibial spurs usually absent . . CHRYSOMELIDÆ.

Antennæ usually long or very long, frequently inserted on frontal prominences; tibial spurs distinct 71

71. Head in front oblique or subvertical; last palpal joint not pointed at the end . . . . . CERAMBYCIDÆ.

Head in front vertical or bent inwards below thorax; last palpal joint pointed at the end . . . . LAMIADÆ.

72. Antennæ rarely clavate and never strongly so; rostrum straight, in the same plane as the upper surface . . . . . BRENTHIDÆ.

Antennæ more or less clavate, usually strongly so 73

73. Maxillary palpi resembling those of the other Coleoptera, not rigid; labrum distinct, legs not fossorial; rostrum short, broad and flat . PLATYRRHINIDÆ (Anthribidæ).

Maxillary palpi short, conical and rigid 74

74. Legs not fossorial; rostrum more or less pronounced, but variable . CURCULIONIDÆ.

Legs fossorial, rostrum practically absent or rudimentary 75

75. First tarsal joint much shorter than the remaining joints united; sides of prothorax not emarginate for reception of legs; head never broader than prothorax . . . SCOLYTIDÆ.

First tarsal joint almost as long as the remaining joints united; sides of prothorax emarginate for reception of legs; head broader than prothorax . . . . . PLATYPODIDÆ.

76. Antennæ not elbowed, the joints of the club not very thin, brought together by rolling up . . . . . PASSALIDÆ.

Antennæ elbowed, not capable of rolling up, the joints of the club not very thin nor co-adapted . . LUCANIDÆ.

Antennæ not elbowed nor capable of being rolled up, the joints of the club very thin and closely co-adapted 77

77. Posterior spiracles situated in the membrane between the dorsal and ventral plates of the segment (Laparosticti) . . . . . SCARABÆIDÆ.

Posterior spiracles situated in the dorsal part of the chitinous ventral segments. (Pleurosticti) 78

78. Labrum membranous, not exposed 79

Labrum chitinous and visible externally 80

79. Mandibles not visible externally; front coxæ vertical . . . . . CETONIADÆ.

Mandibles partly visible externally; front coxæ transverse . . . DYNASTIDÆ.

80. Posterior spiracles placed in strongly diverging lines; claws movable, unequal . . . . . RUTELIDÆ.

Posterior spiracles placed in scarcely diverging lines: claws generally fixed and equal . . . . MELOLONTHIDÆ.

27. HYMENOPTERA (PLATE 9).

1. A deep constriction at the base of the first abdominal segment, conspicuously separating the abdomen from the thorax 2

No marked constriction at the base of the abdomen, the thorax and anterior abdominal segments being approximate equal in breadth. (Tenthredinoidea) 15

2. First abdominal segment (sometimes also the second) forming a lens-shaped scale or knot (petiole), strongly differentiated from the remaining abdominal segments (gaster). (Formicoidea) . . FORMICIDÆ.

Abdominal segments not strongly differentiated as petiole and gaster 3

3. Mesothorax anteriorly without a free prepectus 4

Mesothorax anteriorly with a prepectus; usually winged with venation reduced to a minimum; usually less than 3mm. in length and metallic. (Chalcidoidea) 34

4. Tegulæ present, wings usually well developed, sometimes vestigial or lost 5

Tegulæ wanting, wings entirely absent but general appearance otherwise as in winged forms 9

5. Pronotum with its hind angles or tubercles tangent to a vertical line drawn tangent to anterior edge of tegulæ, touching or underlying tegulæ 6

Pronotum with its hind angles or tubercles always distinctly remote from tegulæ 12

6. Body not laterally compressed . . . 7

Body laterally compressed; trochanters usually composed of a single joint; wings usually with a characteristic venation. [Cynipoidea (part)] . . 32

7. Wings with at least, basal, median and submedian veins present, usually with venation well developed . . . 8

Wings usually without veins or with only subcosta and part of radius present, rarely well developed. [Serphoidea (Proctotrypoidea) (part)] 54

8. Trochanters composed of two joints. [Ichneumonoidea (part)] 21
Trochanters composed of one joint 11

9. Body not compressed laterally 10
Body laterally compressed as in winged forms. [Cynipoidea (part)] 32

10. Body not densely hairy 11
Body densely hairy. [Vespoidea (part)] 66

11. First abdominal segment elbowed. [Ichneumonoidea (part)] 21
First abdominal segment not elbowed. [Serphoidea Proctotrypoidea (part)] 51

12. Hairs of dorsulum simple, not branched or plumose 13
Hairs of dorsulum branched or plumose (Apoidea) 77

13. Abdomen with more than three segments visible, segments beyond third not hidden. (Sphecoidea) 74
Abdomen with three segments visible, segments beyond third hidden. (Chrysidoidea) . . . . . CHRYSIDIDÆ.

14. Cutting edge of mandibles turned inward, their tips meeting or overlapping when mandibles are flexed toward mouth. [Vespoidea (part)] 66
Cutting edge of mandibles turned outward, their tips usually neither meeting nor overlapping when mandibles are flexed toward mouth. [Ichneumonoidea (part)] 21

15. Fore wing with free part of R_2 present; antenna always with more than three segments, third segment

of antenna usually longer than all the following segments together . XYELIDÆ.

Fore wing with free part of R_2 always wanting; antenna with three or more segments, third segment never as long as all the following segments together; if third segment be long, antenna consisting of only three segments . . . . . .

16. Fore wing with base of subcosta always present; pronotum transverse and scarcely emarginate behind . . PAMPHILIIDÆ.

Fore wing with base of subcosta wanting, at most represented only by a pale indistinct line; subcosta usually represented by the free part of Sc_1, which appears like a cross-vein in cell between costa and R+M; pronotum transverse but frequently so deeply emarginate behind that the mesal portion is concealed by the head . . . . . .

17. Fore wing with radial cross-vein received in cell R_4, very rarely in cell R_5; medio-cubital cross-vein joined to R+M or to M; if joined to M, first abscissa of M not more than one-sixth the length of the cross-vein; ovipositor in form of a saw, exserted or retracted; fore tibia with two apical spurs . . . TENTHREDINIDÆ.

Fore wing with radial cross-vein received in cell R_5 rarely in cell R_4 if in cell R_4 medio-cubital cross-vein joining media distinctly distad of radius and subequal in length to first abscissa of media; ovipositor in form of a saw or borer and usually exserted; fore tibia with one apical spur . . . . . .

18. Fore wing with first abscissa of M_2 present; antennæ inserted between

eyes; above base of clypeus, with bases of antennæ fully exposed 19

Fore wing with first abscissa of M_2 wanting; antennæ inserted below level of eyes at base of clypeus under a transverse ridge of the front, their bases concealed . . . . . ORYSSIDÆ.

19. Fore wing with a distinct cell between costa and Sc+R+M; medio-cubital cross-vein subequal in length to first abscissa of media 20

Fore wing without a cell between costa and Sc+R+M; medio-cubital cross-vein from three to five times as long as first abscissa of media . CEPHIDÆ.

20. Fore wing with free part of Sc_1 always present; first abscissa of media extending lengthwise of wing; the last abdominal tergite not ending in a triangular or lanceolate process . XIPHYDRIIDÆ.

Fore wing with free part of Sc_1 always wanting; first abscissa of media extending crosswise of wing; last abdominal tergite ending in a triangular or lanceolate process . SIRICIDÆ.

21. Mesothorax with its sternum and pleuræ, or at least the latter, not divided into an anterior and posterior portion by the presence of a carina or suture; in short, without a prepectus 22

Mesothorax with its sternum and its pleuræ, or at least the latter, more or less divided into an anterior and posterior portion by the presence of a carina or suture; in other words, with a prepectus 26

22. Second and third dorsal segments fused, as is evidenced by the apparent second segment having two pairs of spiracles 23

Second and third dorsal segments not fused, second division of dorsum of abdomen with only one pair of spiracles; all known forms winged; propodeum hardly extending beyond base of coxæ, upper edge of hind coxal sockets or coxal line close to lower edge of abdominal socket or abdominal line 24

23 Cutting edge of mandibles turned inward, their tips meeting or overlapping when mandibles are flexed toward mouth . . . . VIPIONIDÆ.

Cutting edge of mandibles turned outward, their tips neither meeting nor overlapping when mandibles are flexed toward mouth . . . ALYSIDÆ.

24 Frontal line shorter than clypeo-antennal line, or antennæ inserted above middle of face; wings without distinct costal cell, *i.e.*, with but three cells running to base of wing 25

Frontal line longer than clypeo-antennal line, or antennæ inserted below middle of face; wings with a distinct costal cell, *i.e.*, with four cells running to base of wings . STEPHANIDÆ.

25 Spiracles of first and second dorsal segments in or beyond middle; fore wing with only one recurrent vein, first abcissa of cubitus present . PAXYLOMMIDÆ.

Spiracles of first and second dorsal segments before middle; fore wing with two recurrent veins, first represented by cubitodiscoidal vein, first abcissa of cubitus wanting . . BANCHIDÆ.

26 Abdomen with only one or two dorsal segments, or, where with more than two, then with second and third segments fused, so that second division of abdomen has two pairs of

spiracles; propodeum hardly extending beyond base of hind coxæ 27

Abdomen always with more than two dorsal segments and with only one pair of spiracles to the second division, second and third dorsal segments not fused 30

27. Abdomen inserted low down on propodeum, distinctly below middle of latter; upper edge of hind coxal sockets or coxal line close to lower edge of abdominal socket or abdominal line. Cutting edge of mandibles turned inward, their tips meeting or overlapping when mandibles are flexed toward mouth 28

Abdomen inserted high up on propodeum, in middle or above middle of latter; upper edge of hind coxal sockets or coxal line remote from lower edge of abdominal socket or abdominal line . . . . . CAPITONIIDÆ.

28. First abdominal segment not cylindrical, but broadened or bulbous toward apex; with or without wings 29

First abdominal segment cylindrical or nearly cylindrical, not broadened or becoming bulbous at apex; first abscissa of cubitus of fore wing wanting; wings always present . AGRIOTYPIDÆ

29. First abscissa of cubitus of fore wing usually present, fore wing with only one recurrent vein; edges of fused second and third dorsal abdominal segments not meeting beneath . BRACONIDÆ

First abscissa of cubitus of fore wing wanting, fore wings with two recurrent veins; edges of fused second and third dorsal abdominal segments meeting or overlapping beneath . . . . . BRACONIDÆ

30. Abdomen inserted low down on propodeum, distinctly below middle of latter, upper edge of hind coxal sockets or coxal line close to lower edge of abdominal sockets or abdominal line; first abdominal segment broadened or bulbous at apex, not cylindrical; first abscissa of cubitus in fore wing usually absent 31

Abdomen inserted high up on propodeum in middle or above middle of latter; upper edge of hind coxal sockets or coxal line remote from lower edge of abdominal socket or abdominal line . . . . . EVANIADÆ.

31. Costal cell distinct . . . . . TRIGONALIDÆ.

Costal cell obliterated by approximation of costal and subcostal veins . ICHNEUMONIDÆ.

32. Dorsal abdominal segments not extending down along the sides so as to meet beneath ventral segments, therefore all or nearly all of the ventral segments visible 33

Dorsal abdominal segments extending down along the sides and meeting beneath, thereby completely enclosing or concealing the ventral segments or all of the ventral segments except a part of the apical one or the hypopygium . . . . FIGITIDÆ.

33. Basal joint of hind tarsus usually shorter and never much longer than joints two to five united; abdomen not at all or very little longer than head and thorax combined . . CYNIPIDÆ.

Basal joint of hind tarsus at least twice as long as second, third, fourth and fifth joints united; second, third and fourth joints of tarsi longer than fifth, second with a long spinous process extending outwardly abdomen very dis-

tinctly compressed from side to side, spatulate, and distinctly longer than head and thorax united, first to fourth or even including fifth segment nearly equal in length to each other . . . . . IBALIIDÆ.

34. Hind wing not linear, not pedunculate at base; ovipositor issuing far in front of tip of abdomen; antenna elbowed and with one two or three ring-joints, very rarely without ring-joints 35

Hind wing linear, pedunculate at base; ovipositor usually issuing just in front of tip of abdomen; antenna in female most frequently terminating in a distinct fusiform or egg-shaped, solid club, more rarely in a two-jointed club . . . . . MYMARIDÆ.

35. Tarsi 4- or 5-jointed; fore tibia armed with a large curved spur; antenna usually many-jointed 36

Tarsi usually 4-jointed, rarely 3-jointed, very rarely heteromerous; fore tibia with a delicate short straight spur; antenna usually with few joints; antenna at most 9-jointed 19

36. Head in female rarely oblong, never with a deep broad longitudinal furrow above; middle legs not specially slender, the fore and hind legs often short, but their tibiæ always longer (at least never shorter) than their femora. Male most frequently winged, rarely apterous; in the latter case, the abdomen is normal, not long and tubular 37

Head in female oblong, with a deep broad longitudinal furrow above; fore and hind legs very short, the middle legs very slender, sometimes aborted and their tibiæ shorter than

femora. Male always apterous, its abdomen long and tubular . . AGAONIDÆ.

37. Hind femur much swollen 38
Hind femur not greatly enlarged 39

38. Fore wing, when at rest, folded longitudinally; ovipositor curved over dorsum of abdomen . . . LEUCOSPIDÆ.
Fore wing never folded; ovipositor not curved over dorsum of abdomen . CHALCIDIDÆ.

39. Thorax strongly developed, much arched and deeply punctate 40
Thorax not strongly developed 41

40. Stigmal vein not developed; second abdominal segment enclosing other segments . . . . . EUCHARIDÆ.
Stigmal vein developed; abdominal segments visible . . . . PERILAMPIDÆ.

41. Pronotum large; antenna many-jointed; notauli complete 42
Pronotum small, frequently not visible in the middle; antenna usually with few joints 43

42. Body not metallic; sides of scutellum almost straight . . . . EURYTOMIDÆ.
Body metallic; sides of scutellum curved . . . . . CALLIMOMIDÆ (Torymidæ).

43. Mesosternal pleuræ not visible; mid-legs long, saltatorial, with a very long tibial spur 44
Mesosternal pleuræ distinct; mid-legs not saltatorial, first tarsal joint not swollen 45

44. Antenna more than 6-jointed 45
Antenna 6-jointed; marginal vein about as long as subcostal vein . SIGNIPHORIDÆ.

45. Antenna 13-jointed, occipital margin of vertex rounded . . . EUPELMIDÆ.
Antenna 11 jointed; occipital margin of vertex usually acute; notauli obliterated . . . . . ENCYRTIDÆ.

16. Antenna 12- or 13-jointed 17
Antenna 8-jointed; notauli distinct; middle tibial spur moderately long . APHELINIDÆ.

17. Antenna 12-jointed 18
Antenna 13-jointed, with two ring-joints and three joints to the club; occipital line incomplete 18*a*

18. Abdomen distinctly petiolate; occipital line complete . . . . . SPALANGIDÆ.
Abdomen almost sessile; pronotum scarcely visible in the middle; submarginal vein subangulate; stigmal club often large; notauli distinct; funicle of antenna 5-jointed . . TRIDYMIDÆ.

18*a*. Hind tibia with two spurs . . MISCOGASTERIDÆ.
Hind tibia with one spur . . PTEROMALIDÆ.

49. Tarsi 4-jointed 50
Tarsi 3-jointed, pubescence of wings arranged linearly . . . . . TRICHOGRAMMIDÆ.

50. Submarginal vein entire, furnished with many bristles, post-marginal distinct; hind tibia sometimes with two spurs 51
Submarginal vein broken, postmarginal sometimes wanting; hind tibia with one spur; male antenna simple 53

51. Abdomen sessile or with a distinct petiole that is transverse and smooth; notauli either absent or else represented only by very slight impressions 52
Abdomen usually with a distinct petiole; notauli very distinct; antennæ inserted below middle of face, simple in male . . . ELACHERTIDÆ.

52. Hind coxa very large and strongly compressed; head semi-globose, front deeply, sparsely punctate; antenna flabellate in male . . ELASMIDÆ.
Hind coxa normal; postmarginal and stigmal veins rather long; antenna often flabellate in male . . EULOPHIDÆ.

53. Submarginal vein either ornate or provided with two bristles; meta-pleuræ very small; scutellum with two bristles near the middle . . ENTEDONTIDÆ.
Submarginal vein with from one to five bristles; meta-pleuræ triangular, not small; postmarginal vein usually absent; scutellum with four bristles, all behind the middle, often with two longitudinally impressed lines; abdomen sessile . . . TETRASTICHIDÆ.

54. Trochanters with one joint; antenna with fourteen joints; mandibles without teeth; stigma very narrow, long . . . . . PELECINIDÆ.
Trochanters with two joints, or stigma very short and broad 55

55. Antennæ inserted into middle of face 56
Antennæ inserted below middle of face at junction of clypeus with face 58

56. Wings present 57
Wings wanting 63

57. Fore wing with a more or less distinct stigma 65
Fore wing never with a more or less distinct stigma 64

58. Wings present 61
Wings wanting 59

59. Abdomen with sides acute or margined 60
Abdomen with sides rounded . . CERAPHRONIDÆ.

60. Labial palpus with one joint . . PLATYGASTRIDÆ.
Labial palpus with two or more joints SCELIONIDÆ (part).

61. Abdomen with sides acute or margined 62
Abdomen with sides rounded; antenna in female with ten or eleven joints, in male with eleven joints . . CERAPHRONIDÆ.

62. Antenna with ten, eight, or nine joints; no marginal or stigmal vein . . PLATYGASTRIDÆ.
Antenna with twelve, eleven, or seven joints (rarely with ten joints, in which case either the wings bear a large stigma and the entire abdo-

men is longitudinally striated, or the marginal and stigmal veins are present) . . . . . SCELIONIDÆ (part).

63. Labial palpus with two joints . . DIAPRIIDÆ (part).
Labial palpus with three joints . . BELYTIDÆ.

64. Labial palpus with two joints; hind wing with no basal cell . . . DIAPRIIDÆ (part).
Labial palpus with three joints; hind wing always with basal cell . . BELYTIDÆ (part).

65. Mandibles without teeth; antenna with thirteen joints . . . SERPHIDÆ.
Mandibles with teeth; antenna with fourteen or fifteen joints . . HELORIDÆ.

66. Posterior angle of pronotum sharp and above tegula; wings folded longitudinally in repose 67
Posterior angle of pronotum rounded or rather sharp but always in front of or below tegula; wings not folded longitudinally in repose 68

67. Claws dentate; two forms, males and females . . . . . EUMENIDÆ.
Claws simple; three forms, females, males, workers . . . . VESPIDÆ.

68. No constriction between first and second abdominal segments; discoidal cells obsolete, or if the first is present it is petiolate 69
A constriction between first and second abdominal segments, which is usually deep; at least first discoidal cell well defined, not petiolate 70

69. Head oblong; antenna with twelve or more joints; stigma lanceolate; fore tarsus of female never chelate . BETHYLIDÆ.
Head transverse, subquadrate or globose; antenna 10-jointed; stigma large; fore tarsus of female chelate DRYINIDÆ

70. Legs very long, hind femur when directed backward extending beyond middle of abdomen; mesepister-

num with a dividing cephalocaudal suture . . . . . PSAMMOCHARIDÆ

Legs of usual length, hind femur when directed backward not reaching to middle of abdomen; mesepisternum without a dividing cephalocaudal suture 71

71. Sternellum large, sharply defined, extending between intermediate coxæ so that they are well separated; female winged; tibiæ usually flattened with bristles exteriorly . SCOLIADÆ.

Sternellum not defined; intermediate coxæ contiguous; or, if coxæ are somewhat separated, readily distinguished from Scoliadæ by not having sternellum separated from eusternum by a transverse suture; tibiæ not flattened and without a single rugose area; if rugose, nearly uniformly so. 72

72. Clypeus with length and width subequal or nearly so; female winged; apex of abdomen in male without appendages; eyes deeply emarginate . . . . . SAPYGIDÆ.

Clypeus transverse, very much wider than long; apex of the abdomen in male armed or unarmed; eyes usually entire 73

73. Female thorax divided into three parts; apex of abdomen in male armed with a single spine . . METHOCIDÆ.

Female thorax divided into two parts; prothorax being well separated; apex of abdomen in male without spines . . . . . MYRMOSIDÆ.

Female thorax undivided; apex of abdomen in male with two spines . MUTILLIDÆ.

74. Mesosternum produced posteriorly into an elongate process, which is cleft or bifurcate apically; notauli pre-

sent; mid-tibia with two apical spurs; prothorax long; propodeum long; femora swollen near middle; prepectus present . . . . AMPULICIDÆ.

Mesosternum not produced posteriorly into an elongate process; notauli wanting; prothorax usually transverse; femora normally not swollen in the middle 75

75. Prepectus present . . . . SPHECIDÆ.

Prepectus wanting 76

76. Antennæ inserted close to clypeus; cheeks narrow; first abdominal segment not narrower than second; lower posterior margin of propodeum angled, due to metathoracic pleural suture being dorsoventral; no dorsal plate to mesepisternum . . . BEMBECIDÆ.

Antennæ inserted much above clypeus; cheek broad; first abdominal segment much narrower than second; lower posterior margin of propodeum rounded, due to metathoracic pleural suture being curved; a dorsal plate to mesepisternum . . . CERCERIDÆ.

77. Labium or tongue very elongate, slender and always longer than the mentum; first and second joints of labial palpus very elongate, compressed, valvate and very unlike the following joints, which are minute, the third joint uniting with the second a little before apex of second 78

Labium or tongue flattened, usually shorter than mentum, rarely very much longer; basal joints of labial palpus cylindrical, first joint very elongate or thickened but still neither flattened nor unlike the following joints 88

78. Hind tibia without apical spurs. Sexes three, female, worker and male; workers with corbiculæ, female without; maxillary palpus very short, 1-jointed; labial palpus 4-jointed, the joints very unequal, the first two long, valvately compressed . APIDÆ.

Hind tibia with two apical spurs 79

79. First submarginal cell most frequently divided by a distinct but delicate oblique nervure, rarely indistinct; hind tibia and metatarsus in female strongly dilated outwardly concave: metatarsus in female forcipate at base; malar space large, distinct; labrum transverse, subtrapezoidal, the clypeus not carinate; body densely hairy; scutellum semicircular, rounded off posteriorly and not projecting over metanotum; sexes three, female, worker, male; female and worker with corbiculæ and with a dense polleniferous scopa on hind tibia and tarsus; labial palpus 4-jointed; maxillary palpus short, 2-jointed; tongue not extending beyond thorax BOMBIDÆ.

First submarginal cell not (or rarely) divided by a delicate oblique nervure (which, if present, is incomplete or only indicated by a hyaline streak); sexes two, female, male; hind tibia in female outwardly convex or rounded, never concave; no corbiculæ; basal joint of hind tarsus in female not forcipate at base; malar space (except in Psithyridæ) wanting or indistinct, never very large 80

80. Fore wing with three submarginal cells 81

Fore wing with two submarginal cells 85

81. Eyes not nearly extending to base of mandibles, the malar space large,

distinct, longer than pedicel and first joint of flagellum united; marginal cell very long, as long or longer than the three submarginal cells united; body rather densely pubescent; abdomen broadly oval or oblong, flat beneath, convex above; female without polleniferous scopa; male with eyes frequently strongly convergent above, the genitalia, squama and lacinia always membranous . . . . . PSITHYRIDÆ.

Eyes extending to, or nearly to, base of mandibles, the malar space wanting or at most not longer than pedicel 82

82. Marginal cell not especially long or narrow, rarely longer than first two submarginal cells united 83

Marginal cell long and narrow, usually as long or longer than the three submarginal cells united 84

83. Female with dense polleniferous scopa on hind tibia and tarsus; body clothed with dense pubescence; maxillary palpus 2- to 6-jointed . ANTHOPHORIDÆ (part).

Female without polleniferous scopa, or at most with a thin sparse flocculus, on hind tibia; body usually bare or nearly so, the pubescence (if any) short and sparse, rarely densely pubescent; species usually rufous, the abdomen ornamented with white or yellow spots or bands . . NOMADIDÆ.

84. Hind tibia and tarsus with sparse pubescence but without scopa; maxillary palpus usually 6-jointed; body usually metallic or sub-metallic, nearly bare; abdomen elongate, subcylindrical, the segments more or less constricted at sutures; rather small Bees . . . . . CERATINIDÆ.

Hind tibia and tarsus with a dense scopa; maxillary palpus 5-6 jointed, rarely wanting; thorax more or less densely pubescent, at least on sides; abdomen not elongate, with a scopa beneath; eyes in male often strongly convergent above . . XYLOCOPIDÆ (part).

85. Labrum large and free, uncovered; maxillary palpus with 4, 5 or 6 joints; body densely pubescent; hind leg with a dense scopa; ventral scopa present 86

Labrum not large and free, most frequently entirely covered by clypeus (Megachilidæ) or, if somewhat visible, then strongly inflexed (Stelididæ) 87

86. Marginal cell neither long nor narrow . ANTHOPHORIDÆ (part).

Marginal cell very long and narrow . XYLOCOPIDÆ (part)

87. Abdomen in female with a ventral scopa; labrum entirely covered by clypeus . . . . . MEGACHILIDÆ.

Abdomen in female without ventral scopa; labrum more or less visible, not entirely covered by clypeus, strongly inflexed . . . . STELIDIDÆ.

88. Labium or tongue long or short, shorter or not longer than mentum, triangular, not narrowed, rarely long, but always acute medially at apex; hind femur always with a pollen brush or flocculus, rarely very thin and sparse; fore wing with three submarginal cells; labrum not free, more or less hidden by the clypeus, or with basal processes always visible . . . . . ANDRENIDÆ.

Labium or tongue short, broad, obtuse or emarginate at apex, never acute medially; hind femur with or without a distinct pollen brush or flocculus 89

89. Fore wing with three submarginal cells; head and thorax more or less clothed with dense pubescence; second recurrent nervure more or less sinuate; tongue at apex rather deeply triangularly emarginate; hind femur in female with a pollen brush or flocculus	COLLETIDÆ.
Fore wing with two submarginal cells; head and thorax bare or nearly so; second recurrent nervure always straight; tongue very short and broad, shallowly or very obtusely triangularly emarginate at apex; hind femur with no pollen brush or flocculus	HYLÆIDÆ (Prosopidæ).

28. LEPIDOPTERA.

1. The neuration of both wings essentially the same; a jugum is developed at base of dorsum of f. w. as the most important part of the wing-coupling apparatus; never with a spiral proboscis (Homoneura or Jugata)	2
The neuration of the hindwing is reduced so that it contains fewer veins than f. w.; no jugum but h. w. usually with a frenulum (except in a few groups in which it has been lost); a spiral proboscis present except in groups in which it has been lost (Heteroneura or Frenata)	3
2. Maxillary palpi and tibial spurs absent	HEPIALIDÆ.
Maxillary palpi and tibial spurs well developed	ERIOCRANIADÆ.
3. Antenna clubbed or dilated. No frenulum (Butterflies)	4
Antenna not clubbed or dilated, or a frenulum is present when antenna is clubbed or dilated (Moths)	15

4. F. w. all veins free (*i.e.*, from cell or base). Antennæ widely separated and often with a hooked club apically. All legs perfect. Hind tibiæ usually with a medial as well as a terminal pair of spurs . . HESPERIADÆ.
F. w. one or more veins absent or stalked. Antennæ approximated at base. Hind tibiæ with only one pair of spurs 5
5. H. w. without precostal vein . . LYCÆNIDÆ.
H. w. with precostal vein (absent in a few Pieridæ) 6
6. Forelegs fully developed in both sexes 7
Forelegs not fully developed in one or both sexes 9
7. H. w. vein 1*a* absent, claws simple 8
H. w. vein 1*a* present, claws bifid . PIERIDÆ.
8. F. w. vein 8 present . . . . PAPILIONIDÆ.
F. w. vein 8 absent . . . . PARNASSIIDÆ.
9. Forelegs imperfect and brush-like in ♂; developed for walking in ♀ . NEMEOBIIDÆ.
Forelegs imperfect in both sexes (except in two genera) 10
10. F. w. and h. w., cells closed, disco-cellular veins present 11
H. w. cell open, disco-cellular veins absent (occasionally cell slenderly closed) 11
11. F. w. 1 forked at base . . . DANAIDÆ.
F. w. 1 not forked at base 12
12. Palpi nearly as long as thorax, porrect, forming a beak . . . . LIBYTHÆIDÆ.
Palpi not remarkably long, more or less erect, or only obliquely sub-porrect, not forming a beak 13
13. Palpi strongly compressed; eyes often hairy; one or more veins in f. w. usually swollen at base; wings usually short and broad, h. w. often dentate or caudate. . . . SATYRIDÆ.

Palpi not compressed, short cylindrical, slightly clavate; eyes never hairy; veins never swollen; wings always long, h. w. not dentate or caudate . ACRÆIDÆ.

14. Palpi small, narrow and sharp apically MORPHIDÆ.
Palpi large, broad, rounded apically, f. w. cell usually open . . . NYMPHALIDÆ.

15. Lower surface of h. w. with more or less developed double row of dark spine-like scales on lower margin of cell; h. w. usually cleft into three plumes . . . . . ALUCITIDÆ (Pterophoridæ).
Not as above 16

16. Hindwing cleft into more than three plumes . . . . . ORNEODIDÆ.
H. w. not cleft into more than three plumes 17

17. Ventral or lateral surface of palpus with a spot of varying size which contrasts with the rest of the palpus in being bare except for a largish number of dispersed bristles and hair-scales more or less radiating. Frenulum absent . . . . LASIOCAMPIDÆ.
Palpus without a spot as above 18

18.* H. w. with vein 1c absent 19
H. w. with vein 1c present 37

19.† F. w. with vein 5 arising from a point nearer 4 than 6 20
F. w. with vein 5 from middle of discocellulars or from nearer 6 than 4 28

20. H. w. with vein 8 aborted . . . AMATIDÆ (Syntomidæ).
H. w. with vein 8 present 21

* NOTE.—The character given in couplet 18 requires to be used with caution. This vein is almost fully developed in some Bombycidæ (*e.g.*, *Bombyx mori*) but in such cases it is usually obsolescent towards base. In some narrow-winged Tineina, in which the venation is necessarily much reduced, 1c may be absent.

† The character given in couplet 19 also requires to be used with caution. In most Drepanidæ, for example, 5 arises from near the lower cell-angle but in some species it may arise from the centre or from above the centre (*e.g.*, in some species of *Euchera*).

21. H. w. with vein 8 remote from 7 22
H. w. with vein 8 curved and approximated to or anastomosing with vein 7 or connected with it by a bar. 26
22. Frenulum present 23
Frenulum absent 26
23. H. w. with vein 8 anastomosing with the cell to near or beyond middle . LITHOSIADÆ (Arctiadæ).
H. w. with vein 8 anastomosing with cell near base only . . . NOCTUIDÆ (incl. Agaristidæ).
H. w. with vein 8 free or connected the cell by a bar 24
24. Proboscis aborted 25
Proboscis fully developed . . ASOTIDÆ (Hypsidæ).
25. Antenna clubbed . . . . TASCINIDÆ (Neocastniadæ).
Antenna not clubbed . . . LIPARIDÆ (Lymantriadæ).
26. H. w. with a precostal spur to vein 8; chætoseme* present on head . . CALLIDULIDÆ (incl. *Pterothysanus*).
H. w. with no precostal spur to vein 8 27
27. H. w. with vein 1*a* absent or not reaching tornus; traces of a chætoseme in some species . . . DREPANIDÆ.
H. w. with vein 1*a* reaching tornus; no chætoseme . . . . THYRIDIDÆ.
28. Head with postantennal chætoseme (consisting externally of thin radiating bristles, either arranged in a patch placed on a more or less elevated hump, or protruding from the short scaling; this organ may be quite small or strongly developed) 29
Head with no postantennal chætoseme (occasionally vestigial in Thyatiridæ) 31
29. F. w. 7 always stalked with 8 . . GEOMETRIDÆ.
F. w. 7 always remote from 8, usually stalked with 6 or originating with 6 from upper cell-angle 30

* The chætoseme, found in certain Families on the head behind the antenna and near the eye, consists of an area of very varying extent which more or less contrasts with the scaling surrounding or adjacent to it and which is studded with thin bristles; it is obviously a sensory organ but it is not known what kind of sense it subserves.

30. Frenulum absent except for its vestigial base . . . . . URANIADÆ.
Frenulum present (bristles often reduced or absent, but basal incrassation of costal margin of h. w. always present) (includes *Epicopeia*) . . . . EPIPLEMIDÆ (incl. *Epicopeia*).

31. Frenulum truly absent (basal costal margin of h. w. not thickened). . ATTACIDÆ (Saturniadæ)
Frenulum present (but its bristles may be missing ; if so, basal costal margin of h. w. is thickened) 32

32. Both sexes with large cavity under the first abdominal pleurum opening behind the first stigma on the lateral surface of the convex pleurum . THYATIRIDÆ (Cymatophoridæ).
No abdominal tympanal cavity 33

33. H. w. 8 remote from 6, not bent down beyond upper cell-angle 34
H. w. 8 approximated to 6 beyond upper cell-angle 36

34. Metathorax bears (in front of the rather strongly chitinized longitudinal groove bounding the first abd. tergite laterally) a tympanum covering a cavity lying within metathorax . CERURIDÆ (Notodontidæ incl. *Thaumetopœa*).
No metathoracic cavity 35

35. F. w. 8 more or less down-curved, or at least the distance between 8 and 7 greater at base of 8 than at termen ; f. w. vein 9 usually present . . BOMBYCIDÆ.
F. w. 8 not down-curved, the distance between 8 and 7 less at base of 8 than at termen ; f. w. 9 usually absent . . . . . EUPTEROTIDÆ.

36. F. w. cross-vein at end of cell between 4 and 5 longer than that between 5 and 6, and angulate, 5 from well above this angle, at most one subcostal (veins 7-11) free from cell . BRAHMÆIDÆ.

F. w. cross-vein at end of cell between 4 and 5 shorter than that between 5 and 6, not angulate, 6 from below centre, two subcostals (veins 7-11) free from cell . . . . . SPHINGIDÆ.

37. H. w. with 8 anastomosing with or closely approximated to 7 . . PYRALIDÆ.

H. w. with 8 remote from 7 38

38. H. w. with 8 anastomosing with cell . LIMACODIDÆ.

H. w. with 8 free or connected with cell by a bar 39

39 Middle spurs of hind tibia very short or absent 40

Middle spurs of hind tibia, or at least one, well developed 41

40. Proboscis absent 42

Proboscis present; chætosemæ present (proboscis aborted in Phaudinæ and frenulum absent in *Himantopterus*) . ZYGÆNIDÆ.

41. F. w. with 1c absent; frenulum absent; TERAGRIDÆ ("Arbelidæ")

F. w. with 1c present 42

42. Female winged; larvæ not case-dwellers 43

Female wingless; female and larvæ case-dwellers . . . . PSYCHIDÆ

43. Abdomen not extending beyond h. w.; small, rather slenderly-built species; larvæ parasitic on Homoptera. . EPIPYROPIDÆ

Abdomen extending beyond hindwing; large, stoutly built species; larvæ wood-borers . . . . COSSIDÆ.

44. Hindwing with vein 8 concealed in a fold and closely approximated to cell and to 7 throughout, often becoming coincident with 7 towards apex . ÆGERIADÆ

H. w. with 8 not closely approximated to cell and to 7 throughout . .

45. Hind tibia with more or less developed whorls of bristles or scales at origin of spurs, the tarsi always with more or less developed bristles at apex of joints, the midlegs in repose erected over the back or projecting laterally;

palpi slender, acuminate at tip, usually long and excurved, often diverging, sometimes short and porrect . . . . . HELIODINIDÆ.

Hind-tibia without whorls of bristles or scales at origin of spurs, tarsi without bristles at apex of joints 46

46. Labial palpi short, drooping, filiform, pointed . . . . . HELIOZELIDÆ.

Labial palpi long, sickle-shaped, terminal joint long, sharp-pointed, upcurved, reaching above vertex; head smooth; f. w. veins 7 and 8 stalked or coincident 47

Labial palpi long or moderately long, upcurved but not sickle-shaped, terminal joint acuminate at tip (rudimentary in some Blastobasidæ) 50

Labial palpi with terminal joint not acuminate 57

47. H. w. with vein 6 absent . . . . METACHANDIDÆ.

H. w. with 6 present 48

48. Hindwing lanceolate to linear with more or less pronounced costal lobe towards or before $\frac{1}{3}$ from base, accentuated by a projection of stiff scales, and the rest of the costa beyond this nearly straight, the apex always pointed . . . . . COSMOPTERYGIDÆ.

Hindwing without costal lobe, usually rather broad. 49

49. H. w. with termen usually concave before apex, 6 and 7 stalked; if 6 and 7 nearly parallel, then basal pecten of antenna is absent . . YPSOLOPHIDÆ (Gelechiadæ).

H. w. with termen not concave before apex, veins 6 and 7 parallel, basal pecten of antenna normally present but often slightly developed or fugitive or obsolete . . . . . ŒCOPHORIDÆ.

50.	H. w. with basal pecten of hairs on lower margin of cell; f. w. with tufts of scales on surface. Head with dense loosely-appressed hairs. Labial palpi moderate, curved, ascending, second joint not reaching base of antenna, terminal joint half as long as second, pointed . .	COPROMORPHIDÆ.
	H. w. without basal pecten of hairs on lower margin of cell	51
51.	H. w. with vein 8 connected to cell by a bar	52
	H. w. with vein 8 not connected to cell by a bar	53
52.	H. w. with vein 6 absent; f. w. with 6 absent, 7 and 8 coincident . .	PHYSOPTILIDÆ.
	H. w. with vein 6 present, 6 and 7 seldom parallel, usually stalked .	CRYPTOPHASIDÆ (Xyloryctidæ).
53.	H. w. with all veins separate, nearly parallel	SCYTHRIDIDÆ.
	H. w. with all veins not separate .	54
54.	H w. with 6, 7 separate and parallel (seldom approximated and rarely stalked), 2 to 4 not separate and parallel; f. w. with stigmatium*; a strong antennal pecten . .	BLASTOBASIDÆ.
	H. w. with 6, 7 not separate and parallel, 2 to 4 separate and parallel . .	55
55.	F. w. with vein 7 ending on termen .	EPERMENIADÆ
	F. w. with vein 7 ending on costa .	56
56.	Basal joint of antenna with pecten; f. w. with veins 6 and 7 stalked; h. w. with veins 4 and 5 coincident or separate, 6 and 7 stalked .	ELACHISTIDÆ.
	Basal joint of antenna without pecten; f. w. with vein 5 absent; h. w. with cell usually open, 5 and 6 stalked or 6 and 7 stalked	EUPISTIDÆ (Coleophoridæ).

* The stigmatium is a thickened costal space between veins 11 and 12 of forewing.

57. Labial palpus moderate or long, porrect or oblique, the second joint with dense projecting or appressed scales, usually more or less triangular in form, third joint short or moderate, cylindrical, obtuse; wings usually broad, never narrow 58

Labial palpus with second joint not clothed with dense projecting or appressed scales; if triangular in shape, then so formed by long hair scales; wings broad or narrow 62

58. F. w. with vein 2 from beyond $\frac{3}{4}$ of cell and thus rather approximated to angle of cell 59

F. w. with vein 2 from before $\frac{3}{4}$ of cell and thus not approximated to angle of cell 60

59. H. w. with only one vein present between 4 and 7 . . . . . CARPOSINIDÆ.

H. w. with two veins present between 4 and 7 . . . . . PHALONIADÆ.

60. H. w. with basal pecten of hairs on lower margin of cell (on upper surface of wing) . . . . . EUCOSMIDÆ.

H. w. without such a pecten 61

61. F. w. with 8 and 9 stalked or coincident; h. w. with 5 parallel to 4, 6 and 7 stalked . . . . . CHLIDANOTIDÆ.

F. w. with 8 and 9 separate or rarely stalked (it stalked, then h. w. with 5 approximated to 4 at base) . . TORTRICIDÆ.

62. Maxillary palpi 3-jointed, filiform, often curved, seldom minute or rudimentary 63

Maxillary palpi not filiform, porrect 64

63 H. w. lanceolate or linear; f. w. with upper margin of cell usually obsolete on basal third; vein 7 to costa . LITHOCOLLETIDÆ (Gracilariadæ).

H. w. trapezoidal-ovate or elongate-ovate; f. w. with 7 to termen . PLUTELLIDÆ.

61. Both wings with cell open, veins 3 to 5 absent; maxillary palpi long, folded; head rough, antenna with large eye-cap . . . . . NEPTICULIDÆ.
Cell not open in both wings; veins 3 to 5 not all absent 65

65. F. w. with apex bent up or downwards in repose; maxillary palpi usually long, folded; antenna often with eye-cap; head usually tufted above, sometimes smooth . . . LYONETIADÆ.
F. w. with apex not bent up or downwards 66

66. H. w. broader than f. w., trapezoidal, apex pointed, termen strongly sinuate, tornus prominent, veins 5 to 7 nearly parallel; f. w. with 7, 8 stalked or coincident, ending on costa; head densely rough-haired above: antenna much longer than f. w., with basal pecten; eyes sometimes completely divided longitudinally . AMPHITHERIDÆ.
H. w. ovate-triangular, elongate-ovate, or lanceolate, rarely trapezoidal 67

67. Antenna much (often several times) longer than f. w.; h. w. with veins 3, 4 usually separate, 6 often stalked with 5 or 7; maxillary palpi 5-jointed, 3-jointed or rudimentary; wings with bright metallic markings . . . . . ADELIDÆ.
Antenna rarely longer than f. w.. 68

63. Head usually rough; maxillary palpi often long, folded; labial palpi porrect or upturned, more or less obtuse; f. w. with 7 to costa; h. w. with 2 to 4 usually widely separated, 5 and 6 sometimes stalked, 7 separate 69
Head with appressed scales or smooth; maxillary palpi rudimentary or absent 70

69. Wing-membrane prickly; vein 8 in h. w. with strong basal fork or considerably swollen at base; all veins in both wings separate . . . INCURVARIADÆ.

Wing-membrane not prickly; vein 8 in h. w. without strong basal fork; veins in both wings either all separate or some stalked, in h. w. usually separate . . . . . TINEIDÆ.

70. Palpi usually curved, upturned, third joint often transversely appressed, pointed or obtuse; basal pecten of antenna never present; hindwing broadly ovate-triangular to trapezoidal, seldom lanceolate; forewing elongate or subtriangular, often broad . . . . . GLYPHIPTERYGIDÆ.

Palpi moderate, ascending; forewing with stigmatium, vein 7 to termen; head with appressed scales or rough on vertex . . . . . HYPONOMEUTIDÆ.

29. TRICHOPTERA.

1. Minute, often pretty, moth-like pubescent species; f. w. closely covered with projecting, clubbed hairs; cilia very long in f. w., still longer in h. w.; h. w., discal cell open or wanting; wings usually long and narrow, more or less pointed; antenna not longer than f. w., usually thickened; maxillary palpi 5-jointed, strongly hairy, terminal joint neither bowed nor ringed; ocelli usually present . . . . . HYDROPTILIDÆ.

Rarely minute species; f. w. with or without solitary thickened projecting hairs; cilia shorter than width of wing; antenna almost always longer than f. w. 2

2. Ocelli present; max. palpi with only weak hairs. 3
   Ocelli absent 6
3. Terminal joint of max. palpus divided into false ring-joints, curved and as long as third and fourth joints together; front tibiæ with one, two or three spurs . . . . . PHILOPOTAMIDÆ.
   Terminal joint of max. palpus not ringed, rarely curved, subequal to the other joints 4
4. Front tibia with one or no spur; middle tibia with three or two spurs; max. palpi of ♂ 3-jointed, of ♀ 5-jointed, but of similar structure in both sexes . . . . . LIMNEPHILIDÆ.
   Front tibia with two or three spurs, posterior tibia with four spurs; max. palpus 4 or 5-jointed 5
5. Max. palpus 5-jointed, basal two joints very short . . . . . RHYACOPHILIDÆ.
   Max. palpus of ♂ 4-jointed, of ♀ 5-jointed, the joints cylindrical, second joint not short, palpi of two sexes similar . . . . . PHRYGANEIDÆ
6. Tibial spurs 3 : 4 : 4; max. palpi weakly hairy, five-jointed, the first and second joints very small, apical joint ringed and curved; antenna thickened POLYCENTROPODIDÆ.
   Usually two, never three, spurs on front tibia 7
7. Max. palpus scarcely hairy, 5-jointed, apical joint annulate and arcuate . HYDROPSYCHIDÆ.
   Max. palpus usually strongly hairy, apical joint neither ringed nor curved 8
8. Both median and discal cells of f. w. present and closed; maxillary palpus 5-jointed . . . . . CALAMOCEROTIDÆ.
   Median cell of f. w. absent 9
9. Max. palpus of ♂ 3-jointed, of ♀ five-jointed, of different structure in the

two sexes; antenna usually thick, hairy, and with enlarged basal joint; wings thickly hairy, discal cell present	SERICOSTOMATIDÆ.	
Max. palpus five-jointed in both sexes		10
10. Discal cell of both wings absent, neuration of two sexes usually different, apical veins few	MOLANNIDÆ.	
Discal cell of f. w. present . . .		11
11. Middle tibia with two spurs; discal cell of h. w. almost always open or absent, only upper branch of radial sector forked, only the first apical fork present; joints of max. palpus uniform; antenna long and slender	LEPTOCERIDÆ.	
Middle tibia usually with four spurs; discal cell of h. w. closed, both branches of radial sector forked in f. w., at least the first and second apical forks present; basal joint of antenna enlarged	ODONTOCERIDÆ.	

30. MECOPTERA (*Panorpata*).

1. Each tarsus with one claw and modified to raptorial use by folding down the terminal joint against the fourth; legs very long and slender; wings long and very narrow, without markings	BITTACIDÆ.	
Each tarsus with two claws; tarsus of normal shape, not modified for raptorial use; legs long and slender; wings long and moderately broad, usually marked with transverse dark blotches; terminal abdominal segments in male modified to form a large clasping organ, in female acuminate	PANORPIDÆ.	

31. DIPTERA.

1 Antennæ generally longer than thorax, usually composed of 8 to 16 (occasionally as many as 40) free joints and never with a differentiated style or bristle; anal cell widely open, rarely narrowed in the margin of the wing, second vein often forked; calypter absent; palpi usually elongate, pendulous, 4 or 5 jointed; body very rarely with bristles. (Nematocera) 7

Antennæ usually 3-jointed, the third joint often complex or bearing a differentiated style or arista; anal cell distally narrowed or closed, sometimes very short or even absent, second vein never furcate; palpi short, porrect, 1 or 2-jointed. (Brachycera—*sensu lat*) 2

2. Empodia developed pulvilliform, that is, three nearly equal pads under the tarsal claws; head and thorax without strong bristles. (Eremochæta) 17

Empodia wanting or represented by a bristly hair, therefore only two tarsal pads; bristles often well developed; third antennal joint never truly annulated. 3

3. Anal cell much longer than the second basal, either open or closed in or near the margin of the wing, basal cells relatively long, third vein almost always forked. (Asiloidea) 23

Anal cell when present shorter, closed some distance from the wing-margin, if long and acute the third vein is not forked; small cross-vein never formed 4

4. No frontal suture; anal cross-vein usually reflexed; when the anal cell is pointed the arista is terminal and the squamæ (calypteres) and alula are not prominent (Phoroidea) 27

If the anal cross vein is reflexed a frontal suture is evident, if the frontal lunule is obscure the anal cell is longer than the second basal cell; arista almost always dorsal; squamæ (calypteres) and alula usually pronounced. (Cyclorrhapha) 5

5. Anal cell elongate, acute, usually closed toward the wing-margin, but at least longer than the second basal cell which is generally long; frontal suture rarely distinct. (Aschiza) 30

Anal cell, if present, short, closed far from the wing-margin, not acutely produced except rarely by a lobiform prolongation, second basal cell much shorter than the third posterior cell (except in the abnormal neuration of some Pupipara): frontal lunula and suture almost always distinct; never more than three posterior cells; marginal and sub-marginal cells never closed; third antennal joint almost always with dorsal arista; bristles of body and legs usually distinct. (Schizophora) 6

6. Legs not broadly separated; head movably separated from thorax; adults rarely ectoparasites upon warmblooded vertebrates; rarely viviparous, if so, the larvæ are born young (Muscoidea) 34

Legs attached to the sides of the body; head small and closely united with the thorax, or folding back into a dorsal groove; adult flies of a leathery or horny structure, often

wingless, living parasitically upon warm-blooded vertebrates; viviparous, the newborn larvæ well developed, ready for pupation. (Pupipara) 68

7. Thorax with conspicuous V-shaped suture on the mesonotum (sometimes indistinct). Discal cell normally present. All veins equally distinct and complete (sixth vein absent in Ptychopterinæ) . . . . . TIPULIDÆ.

Thorax without conspicuous V-shaped suture on mesonotum (if suture is indistinct, it is not V-shaped) Discal cell absent (except in Rhyphidæ) 8

8. Wing with seven longitudinal veins (apart from the forking of any of these) reaching margin of wing. (But in *Dixa* the seventh vein practically absent). Auxiliary vein always present 9

Wing with less than seven longitudinal veins (apart from the forkings of any of these) reaching margin of wing. (But in *Chironomus* the auxiliary vein and second longitudinal vein always faint) 12

9. Wings bare, never with scales or hairs. Eyes rounded 10

Wings always thickly covered with scales or hairs, or both. Eyes reniform 11

10. Discal cell present. Antennæ distinctly jointed . . . . . RHYPHIDÆ.

Discal cell absent. Antennæ filiform, the apical part indivisible into exact joints . . . . . DIXIDÆ.

11. Wings with scales. Legs long and slender . . . . . CULICIDÆ.

Wings with hairs. Legs short and stout . . . . . PSYCHODIDÆ.

12. Legs short and stout. Antennæ short and stout, shorter than thorax 13
Legs long and slender. Antennæ long and slender, often longer than head and thorax together 14

13. Posterior cross-vein present. Costal vein extending round the margin of the wing. Ocelli present . . BIBIONIDÆ.
Posterior cross-vein absent. Costal vein ending at apex. Ocelli absent SIMULIIDÆ.

14. Wing with secondary venation, forming a spider-web-like network, in addition to the primary characteristic normal venation. Thorax with incomplete suture as in Tipulidæ . BLEPHARICERIDÆ.
Wing large, densely covered with fine hairs; true veins almost absent but an elaborate fan-like development of secondary folds present . . . DEUTEROPHLEBIADÆ.
Wing without secondary venation as above 15

15. Costal vein continued around the whole margin of wing . . . . . CECIDOMYIADÆ.
Costal vein ending at apex, not continued around posterior margin 16

16. Tibiæ without spurs . . . . . CHIRONOMIDÆ.
Tibiæ with spurs . . . . . MYCETOPHILIDÆ.

17. Third antennal joint complex, annulated into 4 to 8 apparent segments, or antenna with more than 5 joints (occasionally as many as 30 or more) 18
Third antennal joint simple, not composed of rings 21

18. No vein on hindmargin of wings, prefurca (*i.e.*, petiole of second and third veins) arising opposite the base of the small and anteriorly placed discal cell, anterior veins usually crowded near the costa, the other veins faint; scutellum often armed . . . . . STRATIOMYIDÆ.

Costa continuing around hindmargin of wing, prefurca longer, veins not crowded forward, the fork of third vein usually enclosing tip of wing, five posterior cells 19

19. Calypteres small or vestigial; head not hemispherical, occiput convex 20

Calypteres conspicuous; third antennal joint composed of 4 to 8 annuli; head widely hemispherical; females bloodsucking . . . . . TABANIDÆ.

20. Face flat or produced, the facial orbits and the checks not sutured; eyes of male not meeting . . . . . XYLOPHAGIDÆ.

Facial orbits and cheeks separated from the central part; eyes of male meeting, scutellum spined. (*Cœnomyia*) CŒNOMYIADÆ.

21. At least the posterior tibiæ with spurs; costa encompassing the wing margin, anterior cross-vein distinct; calypteres vestigial . . . . . RHAGIONIDÆ (Leptididæ).

Tibiæ with short or no spurs; costa greatly thinned beyond apex, anterior cross-vein usually absent or located near base of discal cell 22

22. Head very small as compared with the greatly hump-backed body; calypteres inflated; posterior veins not parallel with hind-margin of wing; eyes in both sexes broadly contiguous CYRTIDÆ.

Head as wide as the depressed thorax; calypteres vestigial; posterior veins parallel with hind margin, first basal cell very long, its forward border continued obliquely across the wing as a "diagonal vein" . . . . NEMESTRINIDÆ.

23. Vertex plane or convex, the eyes not bulging, eyes of males often meeting; legs not robust 24

Vertex sunken, eyes bulging and never contiguous; wing-veins numerous; often large species with strong legs 25

24. Small cross-vein present; five posterior cells, fourth vein ending beyond tip of wing; body usually furry rather than bristly; palpi not broadened apically; abdomen usually rather long and tapering . . . . . THEREVIDÆ.

Small cross-vein absent; four or three posterior cells (if five posterior cells present, the extra one is due to an extra vein bisecting the third); abdomen usually oval 25

25 Proboscis long and thin; body usually stout and furry (rarely, in Systropinæ, extremely slender and bare); a small style usually present; fourth vein ending beyond tip of wing . . . BOMBYLIDÆ.

Proboscis hidden; body bare; antennæ without style; fourth vein ending at tip of wing . . . . . SCENOPINIDÆ (Omphralidæ).

26 Body without bristles; fourth vein curving forward, neuration complex. prefurca (the stalk of second and third veins) short; antennæ with a clubbed style; proboscis usually short, with fleshy expanded tip, palpi vestigial . . . . . MYDAIDÆ.

Body usually with bristles, face bearded: fourth vein not coming forward, neuration normal, prefurca long, proboscis adapted for piercing, not fleshy, palpi usually prominent . ASILIDÆ.

27. Wings, when present, with several stout anterior veins running into the costa and other weak ones obliquely extending across the wing; antennæ placed low, apparently single-jointed and with a long arista; hindlegs long, their femora compressed; small, hunch-backed, quick-running flies . PHORIDÆ.

Neuration fairly normal, without faint oblique veins; antennæ evidently two-or three-jointed 28

28. Wings pointed, no cross-veins except at the base, second basal cell short, second vein ending almost at tip of wing; face with oral vibrissæ; eyes separated . . . . . LONCHOPTERIDÆ (Musidoridæ).

Wings rounded at the tip, second vein ending considerably before the wing-tip, cross-veins present; oral bristles absent; eyes of males often meeting; face usually narrow; predaceous flies 29

29. At least one basal cell evident, discal cell usually separate from second basal cell; calypteres small; proboscis usually rigid; antennal style or arista usually terminal; abdomen typically with seven segments, male genitalia never inflexed; colour very rarely metallic; third vein sometimes forked . . . . . EMPIDIDÆ.

Basal cells small and indistinct, discal cell merged with second basal cell, third vein never forked; calypteres rather large and fringed; proboscis almost always fleshy; abdomen typically with five or six segments excluding the large inflexed genitalia of male; usually metallic . . DOLICHOPODIDÆ.

30. Proboscis rigid, elongate and slender, often folding; face usually with a groove or grooves under antennæ; front broad in both sexes; antennæ with terminal style or dorsal arista; no bristles . . . . . CONOPIDÆ.

Proboscis soft, very rarely elongated; eyes of males usually meeting 31

31. First posterior cell closed, usually an extra vein between the third and fourth longitudinal veins; head and usually body without bristles; arista almost always dorsal; usually bright-coloured flower-frequenting flies;

eyes in both sexes of normal size and nature . . . . . SYRPHIDÆ.

First posterior cell open, no extra vein crossing the anterior (or median) cross-vein 32

32. Rather large species with variegated wings; eyes normal; female with very large corneous ovipositor, circular in cross-section . . . PYRGOTIDÆ.

Rather small dull-coloured species with unmarked wings; eyes in both sexes very large, some of the facets often enormously enlarged 33

33. Arista terminal; hind tibiæ and tarsi dilated, especially in the male; head and thorax with bristles . . PLATYPEZIDÆ.

Arista dorsal; hind legs not dilated; without true bristles . . . PIPUNCULIDÆ.

31. At least the lower calypter large; posthumeral and intra-alar bristles usually both present; thorax with a complete transverse suture, posterior callosity present; male usually with frons narrow or eyes meeting; auxiliary vein always distinct, first vein never short. (*Calyptrate Muscoids*) 35

Lower calypter vestigial or wanting; posthumeral bristle present only in some Scatophagidæ; thorax without a complete transverse suture, posterior callosity usually absent; a visible membrane connecting the dorsal and ventral segments; in both sexes frons of equal width (or, if wider in female, the greater width is due to a widening of the middle strip); fourth vein nearly straight (if curved, never with an appendage); often very small species. (*Acalyptrate Muscoids*) 43

35. Mouth-opening small, the mouth-parts wanting or vestigial, not functional; vibrissæ and bristles absent, no

sternopleural bristles; ventral membrane evident, at least at the base of the abdomen 36

Mouth-opening normal, the mouth-parts functional, proboscis and palpi always distinctly present; usually with sternopleural bristles at least 37

36. No hypopleural bristles or hairs; costa extending to the third vein; first posterior cell very widely open; calypteres rather small . . . GASTEROPHILIDÆ.

Hypopleuræ bearing hairs or bristles; costa extending to fourth vein; first posterior cell closed or narrowed; calypteres large . . . . (ŒSTRIDÆ.

37. No hypopleural fan of bristles (Muscoidea) 38

A fan of bristles on the hypopleura (Tachinoidea) 40

38. Proboscis elongate, rigid, formed for biting . . . . . STOMOXYDINE MUSCIDÆ.

Proboscis normal, not rigid 39

39. Vein IV upturned, nearly closing first posterior cell . . . . NON-STOMOXYDINE MUSCIDÆ.

Vein IV running practically straight to wing-margin . . . . ANTHOMYIADÆ.

40. No dorsal discal macrochætæ except on fourth segment; no convexity just below scutellum; postscutellum rudimentary or absent 41

Discal macrochætæ dorsally on third and usually on preceding segments; metanotum biconvex in profile, there being a small but distinct convexity just below the scutellum, postscutellum thus being very pronounced 42

41. Arista plumose practically to tip; usually metallic species . . . CALLIPHORIDÆ.

Arista usually pubescent; if plumose, only on basal two-thirds . . SARCOPHAGIDÆ.

42. Arista bare or at most pubescent; antenna above middle of eye . TACHINIDÆ.

Arista plumose; legs usually very long; antenna usually at or below middle of eye . . . . . DEXIADÆ.

43. Scutellum very large, completely covering the abdomen . . . . . CELYPHIDÆ

Scutellum not remarkably enlarged 44

44. Auxiliary vein distinctly separate from the first vein and ending in the costa, the first vein usually ending near the middle of the wing; anal cell present 45

Auxiliary vein less distinct, sometimes partly touching the first vein or vestigial, the first vein usually ending much before the middle of the wing 57

45. Oral vibrissæ present; abdomen with more than four visible segments; eyes bare; wings rarely pictured 46

Oral vibrissæ absent 50

46. Costa beset with numerous spines; postvertical bristles convergent; tibiæ with spurs and with preapical bristles HELOMYZIDÆ.

Costa not spinose, even at the auxiliary vein; postvertical bristles divergent or (in *Phycodromia*) subparallel 47

47. Front bristly on the sides and on the vertex 48

Front never bristly near the antennæ; abdomen somewhat elongate and usually narrower at the base . . SEPSIDÆ.

48. Thorax convex; face and cheeks not remarkably bristly 49

Mesonotum and scutellum flattened; front, face and cheeks bristly; all the tibiæ spurred and with preapical bristles; last tarsal joint large . . PHYCODROMIDÆ.

49. Central strip of the front (frontalia) usually well differentiated from the sides (orbits); first vein nearly half the wing-length; second basal cell not minute; cross-veins not close together; frontal cross-bristles absent SCATOPHAGIDÆ.

Central strip of the front not differentiated from the sides; first vein about one-third of the wing-length; second basal cell minute; cross-veins sometimes approximated; frontal cross-bristles sometimes present . . HETERONEURIDÆ.

50. First posterior cell closed or narrowed in the margin; abdomen elongate; legs long or very long 51

First posterior cell widely open (if narrowed, the abdomen is short and the legs not unusually long and slender) 52

51. Eyes large, the cheeks and posterior orbits narrow, occiput concave . TANYPEZIDÆ.

Head more or less globular, the cheeks broad and the face retreating . MICROPEZIDÆ.

52. Hind tibia with a preapical bristle, apical tibial bristles present; ovipositor neither flat nor drawn out; usually two fronto-orbital bristles; wing sometimes pictured 53

Hind tibia without preapical bristle, middle tibia alone with apical bristles; front femur bristly beneath; ovipositor flattened and more or less projecting; postvertical bristles divergent when present; clypeus prominent; wing usually pictured 56

53. Postvertical bristles divergent when present; second antennal joint without a dorsal bristle; meso-pleural and usually sternopleural bristles wanting; front femur not bristly beneath; anal vein reaching the wing-margin 54

Postvertical bristles convergent; second antennal joint with a dorsal bristle; one or two sternopleural and a meso-pleural bristle present; lower outer edge of front femur bearing bristles; anal vein obliterated towards the tip LAUXANIADÆ (Sapromyzidæ).

54. Clypeus well-developed ; vibrissal angle very weak ; more than two dorso-central bristles ; sternopleural bristles sometimes present . . . DRYOMYZIDÆ.

Clypeus vestigial ; not more than two dorso-central bristles ; rarely a single sternopleural bristle . . . TETANOCERIDÆ (Sciomyzidæ).

55. Fronto-orbital bristles extending to the antennæ ; auxiliary vein abruptly bent forward before the tip of the first vein, anal cell angular (*see* also No. 59) . . . . . TRYPANEIDÆ (Trypetidæ).

Fronto-orbital bristles confined to the vertex; auxiliary vein not bent at the end but gently curving 56

56. Anal cell usually acute, the anal vein reaching the margin ; usually two fronto-orbital bristles . . . ORTALIDIDÆ.

Anal cell ss-vein recurved, the anal cell never acute, anal vein abbreviate ; one fronto-orbital bristle . . LONCHÆIDÆ.

57. Head laterally produced as a process bearing the eye ; second basal and discal cells united ; no vibrissæ . DIOPSIDÆ.

Head not produced at the sides ; eyes not stalked 58

58. First joint of hind tarsus (metatarsus) shorter than the following joint and more or less thickened ; vibrissæ present ; front usually bristly ; third antennal joint short and rounded . BORBORIDÆ.

Hind metatarsus longer than the next joint and slender 59

59. Auxiliary vein becoming weak and abruptly turned forward at its end ; anal cell angular or acutely lobed at its posterior distal end ; second basal cell distinct ; wings almost always pictured ; no preapical tibial bristles ; no vibrissæ ; fronto-orbital bristles numerous (*see* also No. 55) . . TRYPANEIDÆ (Trypetidæ).

Auxiliary vein not abruptly ending a considerable distance before the end of the first vein; anal cell not acute 60

60. Costa microscopically broken twice, just beyond the humeral cross-vein and at the end of the auxiliary vein (*N.B.* This is best seen by transmitted light); postvertical bristles convergent; no bristle above the front coxæ 61

Costa not broken near the humeral cross-vein; mouth-opening not wide; arista not feathery 63

61. Anal cell wanting and basal cell fused with discal cell; no vibrissæ; clypeus very large; mouth-opening very large; the centre of the face raised; foremost fronto-orbital bristles diverging; arista bare, hairy or feathered; usually dark-coloured shore-living species . . EPHYDRIDÆ.

Anal cell almost always present; second basal cell usually complete: vibrissæ present; mouth-opening not large; centre of face concave 62

62. Foremost pair of fronto-orbital bristles converging; bristles of the middle of the front less evident; arista loosely pubescent; clypeus small; occiput reaching forward under the eyes . MILICHIADÆ.

Foremost fronto-orbital bristles proclinate; inter frontal bristles rare; arista almost invariably feathered; clypeus large; occiput not forming part of the cheeks . . . . DROSOPHILIDÆ.

63. Anal and second basal cells absent; interfrontalia large; postvertical bristles converging; usually no vibrissæ, fronto-orbital or interfrontal bristles . . . . . CHLOROPIDÆ (Oscinidæ).

Anal and basal cells complete 64

64. Oral vibrissæ present (exceptionally absent in Geomyzidæ); costa almost always broken near the end of the first vein	65
Oral vibrissæ absent; auxiliary vein ending in the costa; clypeus small	67
65. Postvertical bristles convergent when present; auxiliary vein independently ending in the costa; clypeus large; foremost fronto-orbital bristles directed backward; mesopleural bristles present; cilia of the calypteres loose	GEOMYZIDÆ.
Postvertical bristles divergent when present; fringe of the calypteres dense; clypeus small	66
66. Only the uppermost fronto-orbital bristles present; auxiliary vein ending in the costa; no mesopleural or prothoracic bristles; arista bare . .	PIOPHILIDÆ.
Lower fronto-orbitals convergent; auxiliary vein usually ending in the first vein; mesopleural and one prothoracic bristles present; arista closely pubescent	AGROMYZIDÆ (including Phytomyzidæ).
67. Costa usually entire, at most slightly weakened just before the end of the auxiliary vein; basal cells small; postvertical bristles convergent; arista bare; usually densely grey dusted species, the abdomen marked with black or brown spots . .	OCHTHIPHILIDÆ.
Costa interrupted near the end of the first vein; basal cells relatively large; postvertical bristles divergent when present; arista pubescent; rather slender, usually shining species, with the antennæ often very long and hanging downward . . .	PSILIDÆ.
68. Head folding back on the dorsum of thorax; wingless; always parasitic on bats	NYCTERIBIADÆ.

Head sunk into the prothorax, but not folded back; winged or wingless; parasitic on birds and mammals . . . . . .

69. Palpi broader than long, projecting leaf-like in front of the head; wings, when present, with distinct parallel veins and outer cross-veins; claws simple; almost always parasitic on bats; eyes sometimes absent, when present not compound facetted eyes but merely agglomeration of several ocelli; adult female sometimes (*Ascodipteron*) degenerated . . . STREBLIDÆ.

Palpi forming a sheath for the proboscis; wings, when present, with the veins crowded along the costa and with weaker oblique veins extending across the wings; tarsal claws strong and often armed with a series of small teeth; parasitic on birds and mammals; compound eyes present. HIPPOBOSCIDÆ.

32. SIPHONAPTERA.

1. Labial palpus consists of only one segment and does not extend much beyond apex of maxilla (*Stenoponia*) HYSTRICHOPSYLLIDÆ.

Labial palpus consisting of more than one segment 2

2. Thoracic segments shortened and constricted, all three together shorter on dorsal line than first abdominal segment; metathoracic side-plate produced posteriorly and extending over at least two abdominal segments; rostrum (labium) long but weak, consisting of not more than three segments (inclusive of the unpaired basal one) . . . . . TUNGIDÆ (Dermatophilidæ).

Thoracic segments (all three together) longer on dorsal line than first abdominal segment; metathoracic side-plate not extending over more than one abdominal segment; rostrum (labium) more or less strongly chitinized, consisting of four or more segments (inclusive of the unpaired basal one)	. . . . .	3
3. Top of head with distinct articulation above antenna, the anterior portion of head (frons) overlapping the posterior portion (occiput)	. . . . .	4
Top of head without distinct articulation (or, if traces of such, frons not overlapping occiput)	. . . . .	5
4. Maxillæ clubbed or subquadrangular; only two subfrontal ctenidia (Bat fleas)	ISCHNOPSYLLIDÆ.	
Maxillæ triangular, acute at apex; with genal or ante-antennal ctenidia .	LEPTOPSYLLIDÆ.	
5. Club of antenna completely segmented	CERATOPHYLLIDÆ.	
Club of antenna segmented on one side only	PULICIDÆ.	

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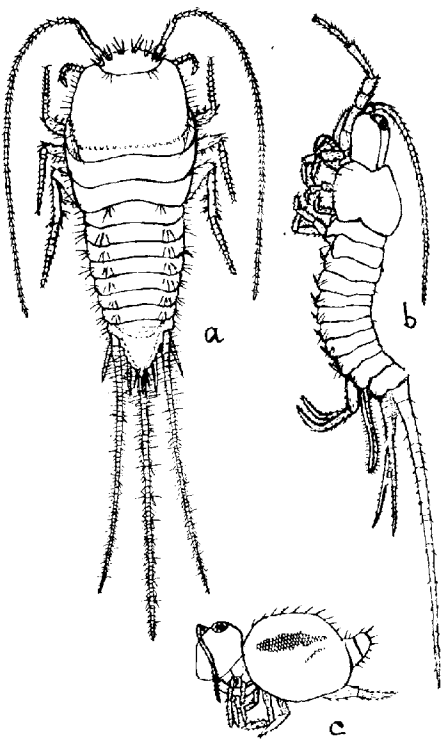
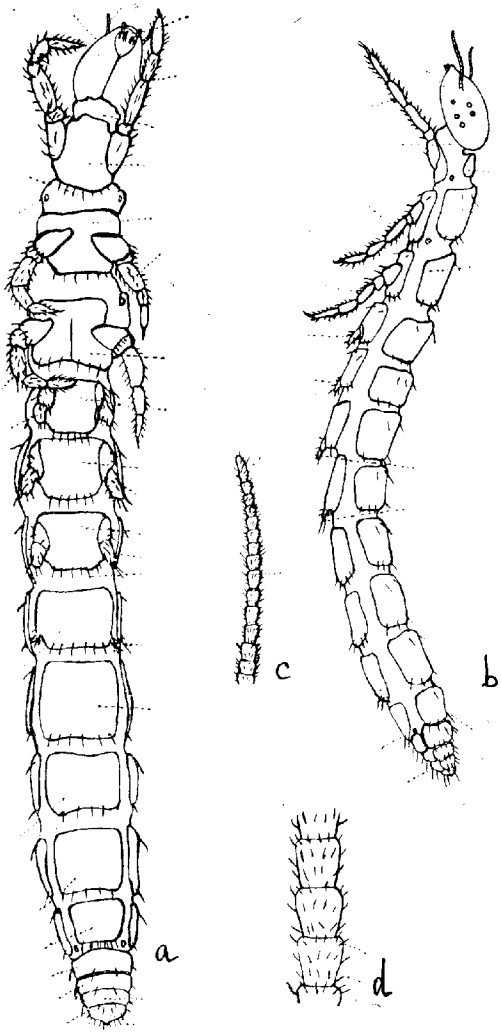
PLATE I.



Lepismatidæ: a. *Acrotelsa collaris.*
Machilidæ: b. *Machilis* sp. (Kumaon).
Sminthuridæ: c. *Sminthurus serratus* (Ritter, fig. 12). (Ceylon).

PLATE II.

Protapteron indicum, Schepotieff.
Zool. Jahrb. XXVIII, t. 3, ff. 1, 2, 7, 8.

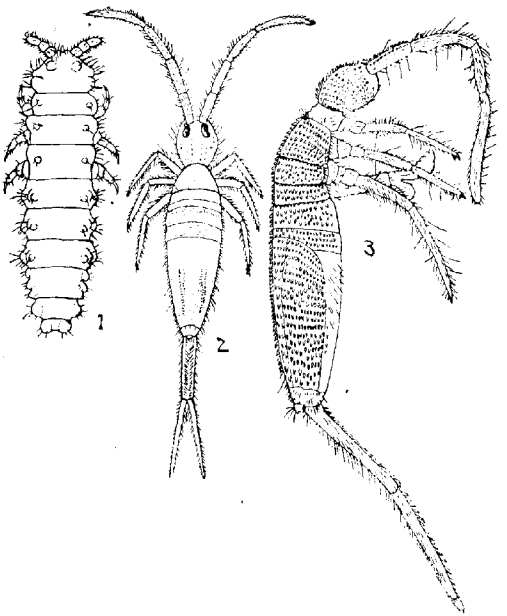


a. (f. 1) ♀ ×135. b. (f. 2) ♂ ×135. c. (f. 7) antenna ×940.
d. (f. 8) middle part of antenna ×1098.

[*Note.*—These figures are copied from those given by Schepotieff. Rimsky Korsakow, however, states (*Zool. Anz. XXXVI.* 164) that there are no antennæ.]

PLATE III.

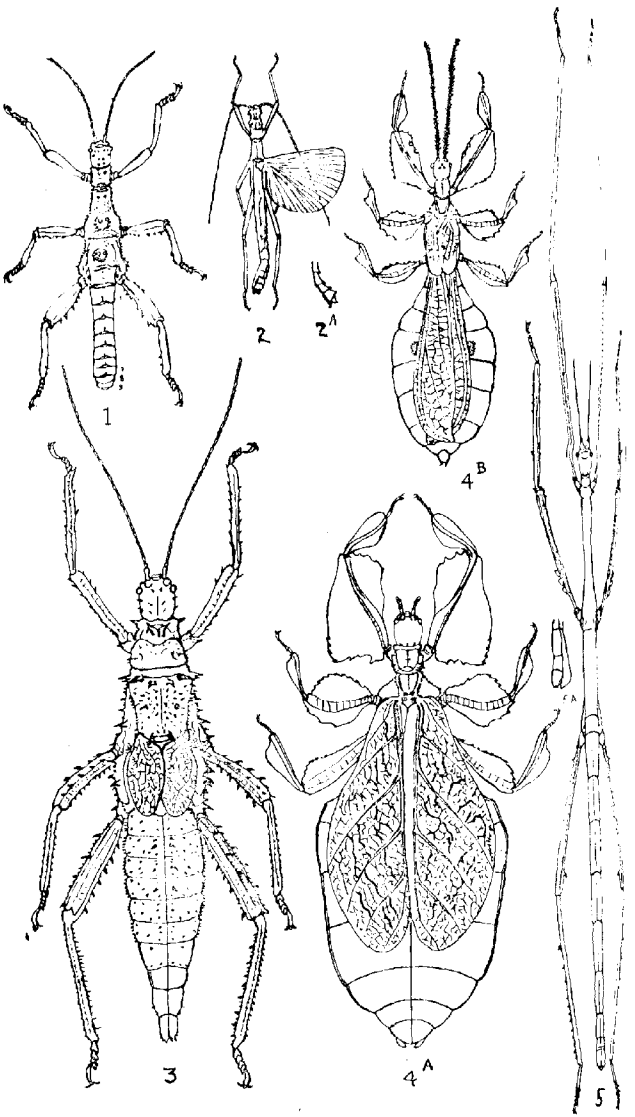
Collembola



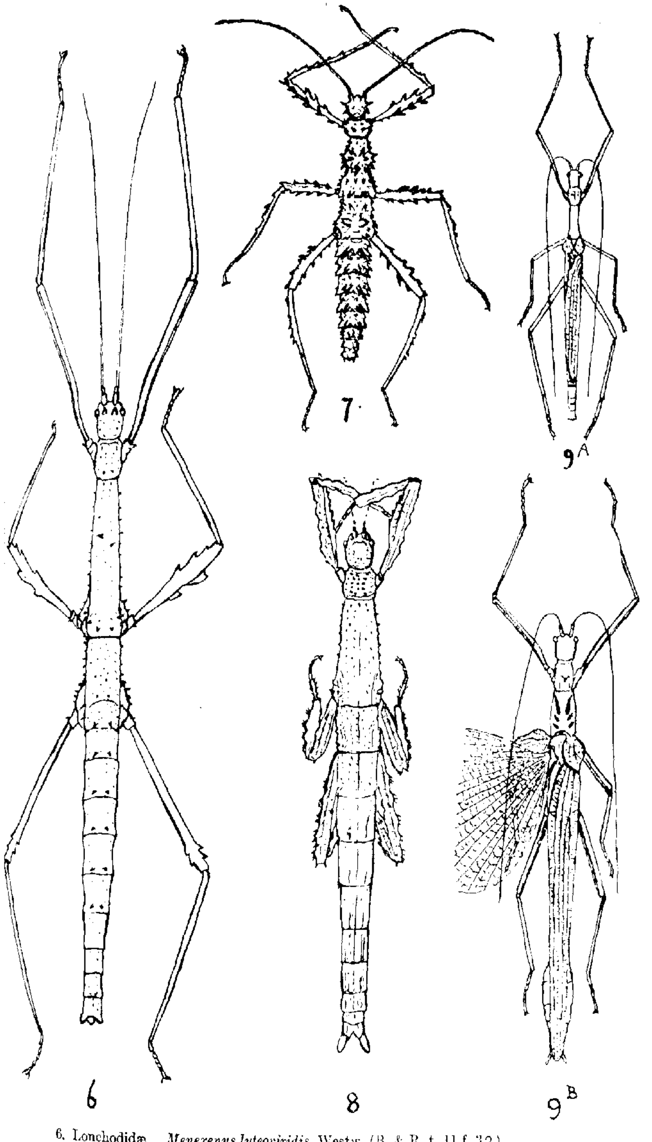
1. Poduridæ: *Neanura coralliua*, Imms (P. Z. S. 1912, t. 7 f. 23).
2. Entomobryidæ: *Entomobrya kali*, Imms (P. Z. S. 1912, t. 8 f. 34).
3. Entomobryidæ: *Paronella travancorica*, Imms (P. Z. S. 1912, t. 10 f. 17).

PLATE IV.

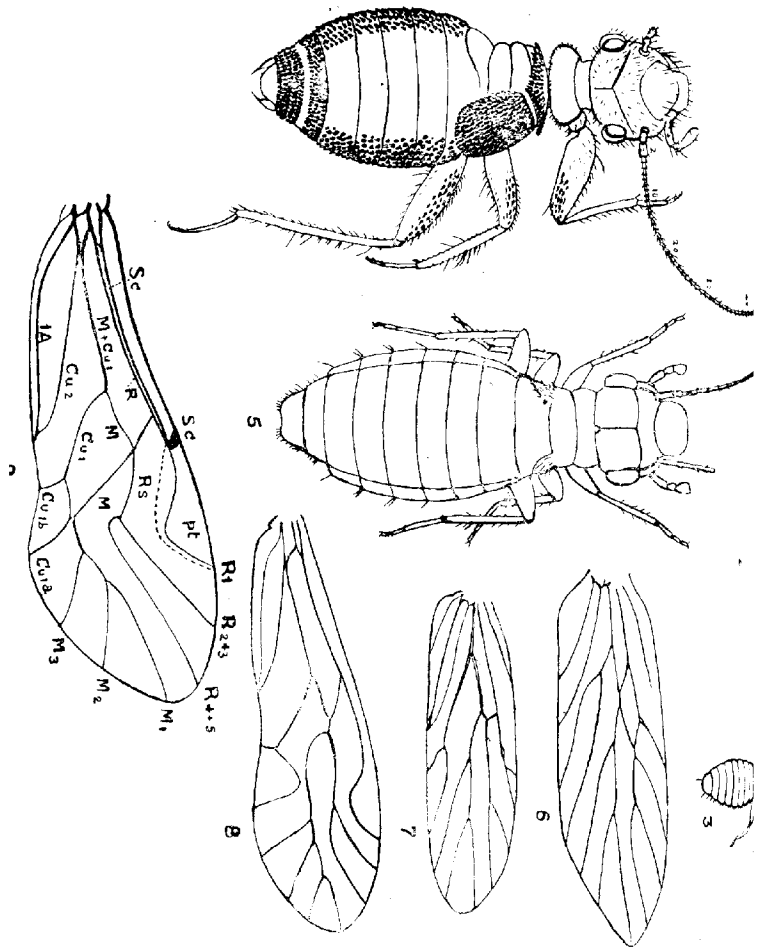
Phasmoida.



1. Obrimidæ. *Pheramenes olivacea*, Westw. (Cat. Phasm. t. 2 f. 8). 2. Aschiphasmidæ. *Bac*

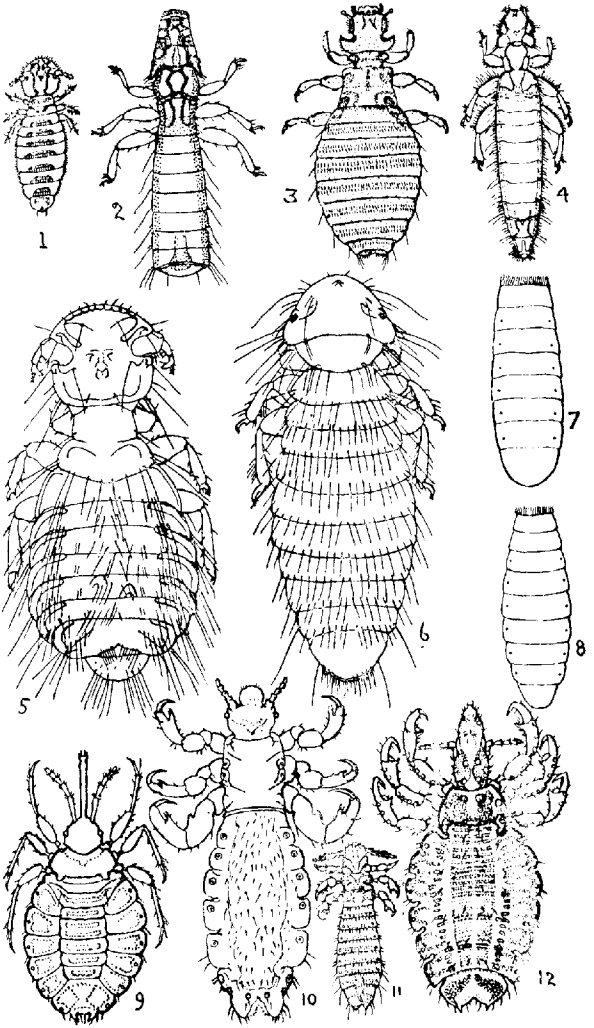


6. Lonchodidæ. *Menexenus luteoviridis*, Westw. (B. & R. t. 11 f. 3♀).
7. Phibalosomatidæ. [illegible] (B. & R. t. 16 f. 10♀).



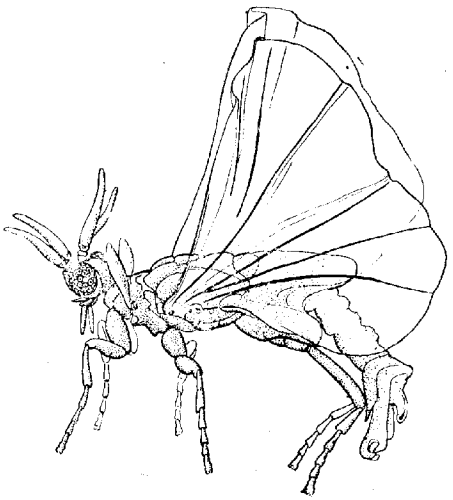
1. *Cœcilius aridus*, Hag. (Ceylon) after Enderlein, Ann. Mus. Hung. I, t. 13 f. 8.
2. *Psocus taprobanensis bengalensis*, Kolbe (Bengal) after Enderlein, Ann. Mus. Hung. I, t. 4 f. 9.
3. *Tropusia oleaginella* Hag. (Troctidæ) after Hagen, Stett. Ent. Ztg. 1882, t. 2 f. 8.
4. *Lepolepis ceylonica* (Lepidillidæ), after Enderlein, S. Z. IV, t. c. f. 24.
5. *Atropos pulsatoria* (Lepidillidæ), after Tillyard, Proc. of N. Zealand, f. 3.
6. *Perientomum greeni* (Lepidopsocidæ) after End., S. Z. IV, t. E. f. 52.
7. *Scopsis vasantasena* (Amphientomidæ) after End., S. Z. IV, t. D. f. 30.
8. *Mesopsocus* after Tillyard. f. 11.

Mallophaga.



1. Trichodectidæ (*Trichodectes equi.*, Linn.) 2. Ricinidæ (*Ricinus tinctus*, Harison (Piaget, t. 51 f. 1, as *Physostomum thoracicum* nec Packard 1870). 3. Gyropidæ. (*Gyropus ovalis* Nitzsch.) 4. Læmobothriidæ (*Læmobrothrium nigrum*, Burm (G. I., t. 3 f. 22 as *atrum*). 5. Philopteridæ. (*Goniodes sectus*, K. & P. (R.I.M., X, p. 224, f. 1). 6. Menoponidæ. (*Menopon monochromateum* K. & P. (t.c., p. 241, f. 5), 7. Stigmata in *Ricinus* (Parasitology VIII p. 108, f. 4); couplet 4. 8. Stigmata in *Menopon* (Parasitology VIII p. 108, f. 2); couplet 4. 9. Hæmatomyzidæ: *Hæm*

PLATE VIII.

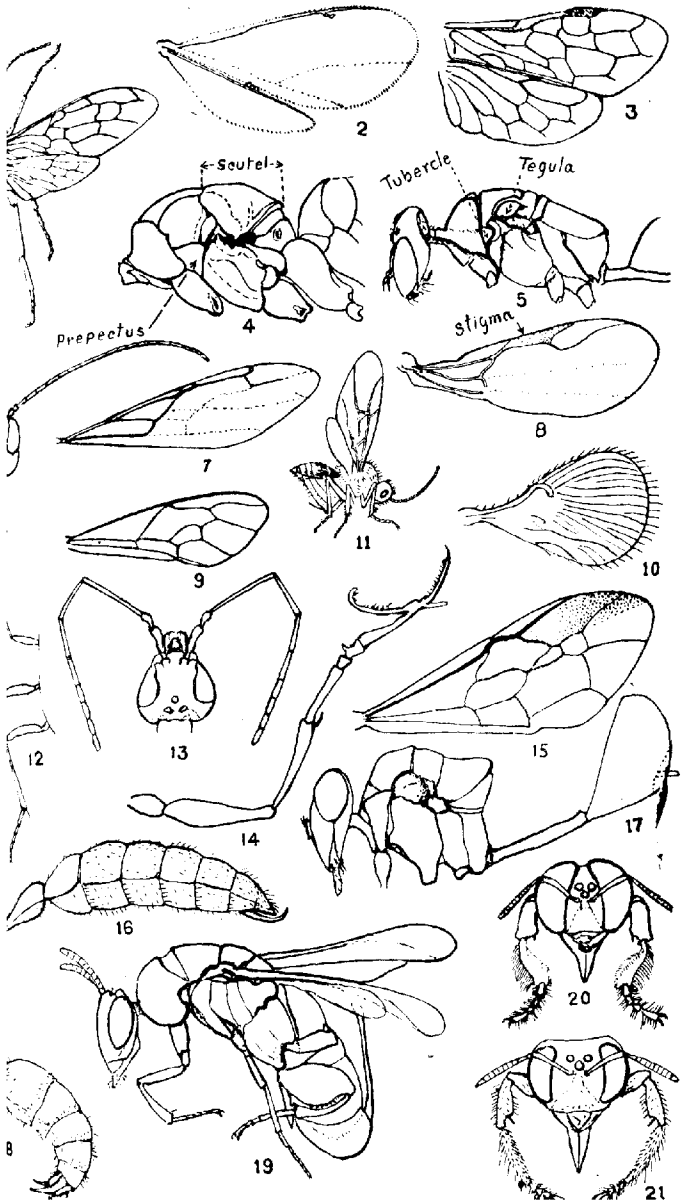


Strepsiptera : Xenidæ.
Xenos sp.
From *Polistes hebræus*, at Pusa.

EXPLANATION OF PLATE IX.

1. *Sirex* sp. $\times 1\frac{1}{2}$ (*Siricidæ*).
2. Wings of *Asympiesiella indica*, Girault, $\times 17$ (*Eulophidæ*).
3. Wings of *Anoplolyda indica*, Rohwer. $\times 5$ (*Pamphiliidæ*).
4. Thorax of *Syntomaspis* (after Viereck) (highly magnified) (*Callimomidæ*)
5. Thorax of *Sphex lobatus*, Fb. $\times 3$ (*Sphecidæ*).
6. Head of *Diastephanus bilineatus*, Elliott, $\times$ 10 (*Stephanidæ*).
7. Forewing of *Diastephanus bilineatus*, Elliott, $\times 10$ (*Stephanidæ*).
8. Forewing of *Mesodryinus indicus* ♀, Kieffer (MS.) $\times 24$ (*Dryinidæ*).
9. Forewing of *Henicospilus horsfieldi*, Cam. $\times 2\frac{1}{2}$ (*Ichneumonidæ*).
10. Forewing of a Trichogrammid $\times 80$ (*Trichogrammidæ*).
11. *Cynips lozæ*, Bosc (after Kieffer) magnified —(*Cynipidæ*).
12. Legs of an Encyrtid magnified $\times 16$ (*Encyrtidæ*).
13. Head of *Mesodryinus indicus*, Kieffer (MS.) ♀ $\times 20$ (*Dryinidæ*).
14. Foreleg of *Mesodryinus indicus*, ♀, Kieffer (MS.) ♀ $\times 24$ (*Dryinidæ*).
15. Forewing of *Paecilogonalos pulchella*, Westwood (after Schulz) magnified —(*Trigonalidæ*).
16. Abdomen of *Methoca smithi*., Magr. ♂ $\times 16$ (*Methocidæ*).
17. Abdomen of *Eucharis deprivata*, Westw. $\times 20$ (*Eucharidæ*).
18. Abdomen of *Mutilla dives*, ♂ $\times$ 4 (*Mutillidæ*).
19. A Leucospid $\times 5$ (*Leucospidæ*).
20. Head of *Xylocopa latipes*, Drury, ♂ $\times$ 2 (*Xylocopidæ*).
21. Head of *Xylocopa latipes*, Drury, ♀ $\times$ 2 (*Xylocopidæ*).

PLATE IX.


Scutel
Tubercle
Tegula
Prepectus
stigma
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